

# **ANNUAL REPORT**

## **2013 – 2014**



**INDIAN INSTITUTE OF ENGINEERING SCIENCE  
AND TECHNOLOGY, SHIBPUR  
HOWRAH – 711 103**



**Professor Ajoy Kumar Ray**  
*Director*



**INDIAN INSTITUTE OF ENGINEERING SCIENCE AND  
TECHNOLOGY, SHIBPUR**

P.O. – Botanic Garden, Howrah – 711103,  
West Bengal, India

Phone: (033) 2668 2674, Fax: (033) 2668 7575

E-mail: [director@iist.ac.in](mailto:director@iist.ac.in) , [ajoy\\_ray2004@yahoo.com](mailto:ajoy_ray2004@yahoo.com)

It gives me immense pleasure to bring out the annual report of our Institute for the year 2013-14. At the outset, let me congratulate all the stakeholders of the Institute for achieving a long cherished dream. On 4<sup>th</sup> March, 2014, our University has been transformed to Indian Institute of Engineering Science and Technology, an Institute of National Importance by an act of the Parliament. The Government of India has conferred this status on this one hundred and fifty eight year old Institute in recognition of its contributions to the progress of civilization through developments in the field of Science and Technology all over the globe. As a Centrally funded institute our commitment to the service of the Nation shall increase many fold and I am happy to announce that our academic community is ready to take up the challenge of achieving excellence in the field of science and technology.

Since the last convocation of our Institute held on January 13, 2013 we have marched forward in our pursuit of academic excellence in all spheres of teaching, research and extension activities. Our university has always laid great stress on research. This year 34 fellows have been awarded Ph.D degree and 183 fresh research scholars have enrolled for Doctoral programme. The Faculty members have been consistently devoting their energies to quality research apart from teaching. During the last year, there have been over 694 publications in peer reviewed national and international journals and conference proceedings. Further, 8 books have also been published by the Faculty members.

In the very recent past, the Institute has witnessed a quantum jump in the number of sponsored research projects. It is a matter of considerable pride that currently 135 projects worth Rs. 75 crores are under operation. In the last year alone, 33 new sponsored projects worth about 14 crores have commenced operation. There are at present 92 on going consultancy projects in different Departments of the University.

I am happy to announce that the Sophisticated Analytical Instrument Facility has been set up in the University with funding from DST, Govt. of India which will augment the existing Central Research Facility of the University considerably.

The Institute is one of the major participants of TEQUIP – II launched by the Govt. of India. With their funding, we have established a Centre of Excellence in the area of Microstructurally Designed Advanced Materials Development. Three new laboratories on GIS and Remote Sensing, Composite Mechanics and Advanced Computational Mechanics have been set up using this fund. A few of our existing laboratories like Microwave Engineering laboratory, X-Ray and Crystallographic Laboratory, CAD Laboratory and Information and Communication Engineering Laboratory have been modernized. Sophisticated instruments like X-Ray Diffractometer with texture Goniometer, Atomic Absorption Spectrophotometer, Electron Beam Evaporation System etc. have also been procured.



Research Scholarships have been provided from the TEQUIP fund to 40 Engineering students and 5 Applied Science students for pursuing Ph.D work. The TEQUIP-II of the University organized Research Scholar's week in January this year as a part of which a seminar on 'Science and Technology Education in the 21<sup>st</sup> Century- a Road map towards Excellence ' was organized where several Directors and former Directors of IITs presented their ideas to the Faculty members and researchers.

In consistence with previous years, this year too several faculty members have been lauded and have won recognition for their superior academic performance. To name a few : Prof. Parthapratim Chattopadhyay from the Department of Metallurgy and Materials engineering won the title of National Metallurgist of the year 2013 and felicitated as Eminent Engineer of the Year by the Institution of Engineers, India. Prof. Sabyasachi sarkar, from the Department of Chemistry was elected as Fellow of the Royal society of Chemistry, UK. Prof. S. K. Saha, from the Department of Mechanical Engineering was elected as Chartered Engineer and Fellow of the Institution of Mechanical Engineers, London. Prof. Partha Bhattacharya from the Department of Electronics and Telecommunication Engineering received the Best Paper award at the Young Scientist Colloquium 2013 organized by Materials Research Society of India. About 14 Faculty members and one research scholar attended International Conferences and made Academic visits to countries like USA, Japan, Austria, Ukraine and Greece.

It has been an honour on the part of the Institute to have hosted a large number of distinguished academicians and Industrialists during the period under review. To name a few : Prof. Wout Van Bommel, International Lighting Consultant, Dr. Manasendu Kundu, University of California, Prof. Neil Shirtycliffe from Rhine wall university of Applied Science, Germany and many others.

It is heartening to note that the students of the Institute have been performing extremely well, both in academic as well as in extra curricular activities. Hrilina ghosh, M. Tech student of Electronics and telecommunication engineering received an Innovative Students' Project Award by the Indian national Academy of Engineering in 2013. Anuja Roy, Ph.D scholar of Civil Engineering received a Best Session Paper Award at the International Conference on Structural Engineering and Mechanics, Sourav Kundu, Vaibhav Vineet and Debjoyti Panda of Civil Engineering have made International journal and conference publications from their project work. Different students' bodies like the Photographic Society, the Music society, the Dramatic Society etc. have arranged colorful cultural programmes and Annual Drama Festival.

Apart from teaching and research, faculty members are also involved in various extension activities and social outreach programmes. More than one lakh people in rural Bengal have been benefitted from the filters installed by the Department of Civil Engineering that provides Arsenic-free water. A research by Prof. Sabyasachi Sarkar on low cost water soluble nano carbon used to stop mosquito breeding has been acclaimed internationally. The school of Community Science and Technology has been identified as one of the implementing agencies of Corporate Social Responsibility scheme of the Govt. of India. The Equal Opportunity Cell of the University has been conducting Remedial Coaching for SC/ST/Minority/OBC students of non creamy layer and also arranging coaching for entry into services and training in foreign languages for such students.

From the Annual Report of various Departments, Schools, Centres and Administrative sections, it will be manifested that our Institute is consistently moving ahead at a very fast pace, creating manpower and contributing in the Development of the Nation.

I would like to extend my heartiest thanks and congratulations to all Faculty members, students, officers and staff of the University for working together in an effort to achieve excellence. My special thanks to the team who worked tirelessly to bring out this Annual Report.

**(Ajoy Kumar Ray)**  
Director





# Content

| <b>Sl. No.</b> | <b>Subjects</b>   | <b>Page No.</b> |
|----------------|---|-----------------|
| i              | Introductory note with a brief history of the University  | 7 – 8           |
| ii             | List of Administrative Heads / Governance                 | 9 – 12          |
| iii            | Members of Various committees                             | 13 – 34         |
| <b>A</b>       | <b>Department</b>   |                 |
| 1              | Aerospace Engineering and Applied Mechanics Department    | 35 – 46         |
| 2              | Civil Engineering Department                              | 47 – 62         |
| 3              | Chemistry Department                                      | 63 – 78         |
| 4              | Computer Science and Technology Department                | 79 – 90         |
| 5              | Electrical Engineering Department                         | 91 – 114        |
| 5              | Electronics and Tele Communication Department             | 115 – 128       |
| 6              | Earth Sciences Department                                 | 129 – 134       |
| 7              | Humanities and Social Sciences Department                 | 135 – 140       |
| 8              | Information Technology Department                         | 141 – 164       |
| 9              | Mathematics Department                                    | 165 – 180       |
| 10             | Mechanical Engineering Department                         | 181 – 198       |
| 11             | Metallurgy and Materials Engineering Department           | 199 – 210       |
| 12             | Mining Engineering Department                             | 211 – 220       |
| 13             | Physics Department  | 221 – 238       |
| 14             | Human Resource Management Department                      | 239 – 244       |
| 15             | Department of Students' Activities                        | 245 – 250       |
| <b>B</b>       | <b>Schools</b>  |                 |
| 1              | School of Community Science and Technology (SOCSAT)       | 251 – 272       |
| 2              | School of Disaster Mitigation Engineering (SDME)          | 273 – 290       |
| 3              | School of Safety & Occupational Health Engineering (SSOH) | 291 – 296       |
| 4              | PDSIT   | 297 – 312       |
| 5              | School of Materials Science & Engineering (SMSE)          | 313 – 326       |
| 6              | School of Management Sciences (SOMS)                      | 327 – 336       |
| 8              | School of Mechatronics & Robotics (SM&R)                  | 337 – 344       |
| 9              | School of VLSI Technology                                 | 345 – 358       |
| <b>C</b>       | <b>Centres</b>  |                 |
| 1              | Centre of Excellence for Green Energy and Sensor Systems  | 359 – 376       |
| 2              | Centre for Healthcare Science and Technology              | 377 – 388       |
| <b>D</b>       | <b>Others</b>   |                 |
| 1              | Library   | 389 – 392       |
| 2              | Equal Opportunity Cell                                    | 393 – 398       |
| 3              | 14 <sup>th</sup> Annual Convocation                       | 399 – 402       |
| 4              | List of Consultancy work (2013 – 14)                      | 403 – 406       |
| 5              | List of Projects (2013 – 14)                              | 307 – 410       |
| 6              | Financial Report (2013 – 14)                              | 411 – 418       |



## **Introductory note with a brief history of the Institute**

❖ Bengal Engineering College, commonly known as B.E.College started its journey as the Civil Engineering College on 12th February 1856. During this long journey, this pioneering Engineering College achieved one milestone after another. Since 1856 a number of other Departments were gradually included which have produced many reputed Engineers.

❖ There are various phases through which this institution has passed, over the last 150 yrs

❖ On January 24, 1857 the faculty of Civil Engineering was formed with the establishment of Calcutta University.

❖ On May 2, 1857 the Civil Engineering College was affiliated to the University.

❖ In November 1864 the Civil Engineering College lost its separate entity and independent existence and The Civil Engineering College become the Civil Engineering Department of the Presidency College and remained attached to it as an adjunct till 1879.

❖ The Civil Engineering College become the Civil Engineering Department of the Presidency College and remained attached to it as an adjunct till 1879.

❖ In the year 1880 the College occupied the premises of the Bishop's College at Shibpur and from the 5th April 1880, the college under the name Government Engineering College, Howrah started functioning.

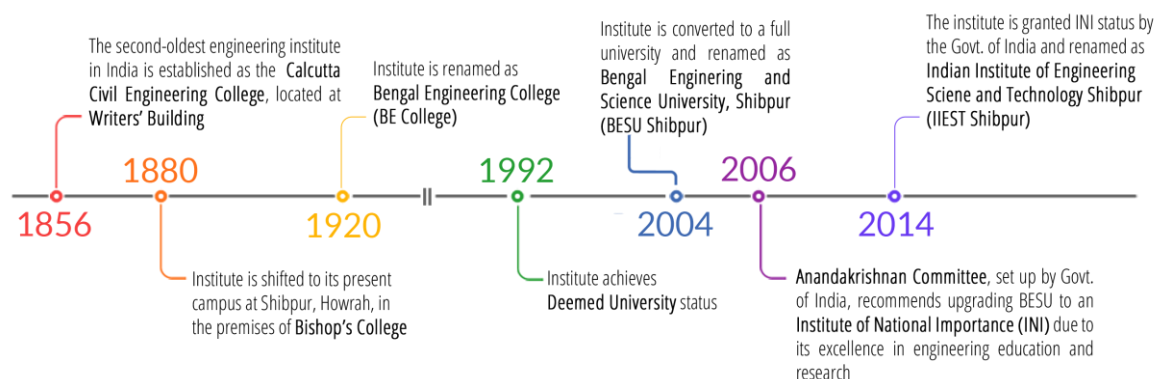
❖ On 18th May 1887, the name was changed to the Civil Engineering College Seebpore, gradually under went changes, namely, first Sibpur and then Shibpur.

❖ As a first step to reach the goal of including other Departments along with Civil Department the nomenclature of the college was changed from the 12th February 1920 to the Bengal Engineering College, Sibpur

❖ From March 24, 1921 in order to avoid postal delay the College was redesignated as the "Bengal Engineering College" which came to be popularly known as B.E.College.

❖ On 16.02.1993, the BE College was given the status of Deemed University and from October 1, 2004 the Director was designated as the Vice-Chancellor and the Deemed University was given the status of a full fledged State University under the name Bengal Engineering and Science University, Shibpur.

### **IEST Shibpur**





## LIST OF ADMINISTRATIVE HEAD / GOVERNANCE

Shri M.K. Narayanan  
Chancellor

Prof. Ajoy Kumar Ray  
Vice Chancellor upto 03.03.2014 & Director from 04.03.2014

Dean Faculty of Engg & Tech  
Prof. Gautam Bandyopadhyay (19.12.2012- 17.04.2013)  
Prof. Partha Protim Chattopadhyay (18.04.2013-)

Dean Faculty of Basic & Applied Sc.s  
Prof. S. P. Goswami (19.12.2012- 17.04.2013)  
Prof. Binayak S. Choudhury (18.04.2013-)

Dean Faculty of Social and Management Sciences  
Prof. Anjan Kumar Ghosh (19.12.2012- 17.04.2013)  
Prof. Madhumati Dutta (18.04.2013-)

Dean of Students (PICSA)  
Prof. Anjan Kumar Ghosh  
Prof. Aditya Bandyopadhyay

## MEMBERS OF COURT

| Name   | Position   | Address   |
|--|--|---|
| Shri M. K. Narayanan<br><b>Chancellor &amp;<br/>Governor of West Bengal</b>                                | Chairman   | Raj Bhavan, Kolkata –<br>700001<br>Ph: 2200-1641<br>Fax: 033-22002444   |
| <b>Prof. Ajoy Kumar Ray</b><br>Director  | Vice<br>Chairman<br>upto<br>03.04.2014 &<br>Director<br>04.04.2014 - | IEST, Shibpur, Howrah<br>Ph: 2668 2674, Fax : 2668<br>7575<br>E-mail : vc@becs.ac.in,<br>ajay_ray2004@yahoo.com |
| Sri Sukumar Gorai<br>Additional Secretary, Higher Education Dept.,<br>Govt. of West Bengal, or his nominee | Member   | Kolkata   |
| Sri Dipankar Saha,<br>Secretary, Finance Dept., Govt. of West Bengal                                       | Member   | Bikash Bhawan,<br>Kolkata – 700 091<br>Writers' Building,<br>Kolkata – 700 001                                  |
| Prof. Milan Kumar Sanyal, Director, Saha<br>Institute of Nuclear Physics                                   | Member   | Salt Lake, Kolkata  |
| Prof S. Bhattacharyya, Former Director, TIFR   | Member   | Mumbai  |

|   |        |   |
|---|--------|---|
| Prof. Khole, Former Vice Chancellor, Mumbai University  | Member | Mumbai  |
| Prof Rama Rao, Former Member AEC & Secretary to the Govt. of India  | Member | ----  |
| Prof Hasnain, Former Vice Chancellor, Central University, Hyderabad   | Member | Hyderabad   |
| Prof. Mihir Kumar Chaudhury, Vice Chancellor, Tejpur University   | Member | Napaem, Tejpur  |
| Prof. Binayak Kr. Dutta, The President, West Bengal Council of Higher Secondary Education   | Member | Vidysagar Bhawan, 9/2, Block-DJ, Sector-11 Salt Lake, Kolkata – 700 091 |
| Prof. Binoy Kanti Dutta<br>Chairman, West Bengal Pollution Control Board  | Member | Kolkata   |
| Prof. Gautam Bandyopadhyay (19.12.2012-17.04.2013)<br>Prof. Partha Protim Chattopadhyay(18.04.2013-) Dean, Faculty in PG & UG Studies in Engineering and Technology | Member | IEST, Shibpur, Howrah   |
| Prof. S. P. Goswami (19.12.2012- 17.04.2013)<br>Prof. Binayak S. Choudhury (18.04.2013-till), Dean, Faculty in PG & UG Studies in Basic and Applied Sciences        | Member | IEST, Shibpur, Howrah   |
| Prof. Anjan Kumar Ghosh (19.12.2012-17.04.2013)<br>Prof. Madhumati Dutta (18.04.2013-), Dean, Faculty in PG & UG Studies in Social and Management Sciences          | Member | IEST  |
| Prof. Salil Halder<br>Professor and Head of AEAM  | Member | IEST  |
| Prof. Arup Sarkar<br>Head of ARTP   | Member | IEST  |
| Prof. Kalyan Kumar Bhar<br>Professor and Head, Department of Civil Engineering  | Member | IEST  |
| Prof. Prasanta Kumar Nandi<br>Professor and Head, Department of Chemistry   | Member | IEST  |
| Prof. Sipra Das Bit<br>Professor & Head, Department of Computer Science and Technology  | Member | IEST  |
| Prof. Biswarup Basak<br>Professor and Head, Department of Electrical Engineering  | Member | IEST  |
| Prof. Monojit Mitra<br>Associate Professor & Head, Department of Electronics & Tele Communications  | Member | IEST  |
| Prof. Bhabani Prasad Mukhopadhyay<br>Professor and Head, Earth Sc. Department   | Member | IEST  |

|  |        |         |
|--|--------|---------|
| Prof. Manas Kumar Sanyal<br>Professor & Head, Humanities and Resource Management                           | Member | IEST    |
| Prof. Mallika Ghosh Sarbadhikary<br>Associate Professor & Head, Humanities and Social Sciences Department  | Member | IEST    |
| Prof. Santi Prasad Maity<br>Associate Professor & Head, Department of Information Technology               | Member | IEST    |
| Prof. Murari Mitra<br>Professor and Head, Mathematics Department   | Member | IEST    |
| Prof. Sujoy Kumar Saha<br>Professor and Head, Department of Mechanical Engineering                         | Member | IEST    |
| Prof. Sanjoy Sadhukhan<br>Associate Professor and Head, Department of Metallurgy And Materials Engineering | Member | IEST    |
| Prof. Prabir Kumar Paul<br>Professor & Head, Department of Mining Engineering                              | Member | IEST    |
| Prof. Sampad Mukherjee<br>Associate Professor and Head, Physics Department                                 | Member | IEST    |
| President , WB Madrasa Education Board   | Member | Kolkata |
| President, WB Board of Secondary Education   | Member | Kolkata |

### **Members of the Executive Council**

| <b>Name</b>   | <b>Position</b> | <b>Address</b>  |
|---|-----------------|---|
| Vice Chancellor<br>Prof. Ajoy Roy   | Chairman        | IEST, Shibpur, Howrah<br>Ph: 2668 2674, Fax : 2668 2916<br>E-mail : vc@becs.ac.in<br>Ajoy_ray2004@yahoo.com |
|   |                 |   |
| <b>Deans : Faculty Councils for PG &amp; UG Studies</b>   |                 |   |
|   |                 |   |
| Engineering and Technology<br>Prof. Partha Protim Chattopadhyay(18.04.2013-)                    | Member          | Bengal Engineering and Science University, Shibpur, Howrah & IEST, Shibpur, Howrah                          |
| Basic and Applied Sciences<br>Prof. Binayak S. Choudhury(18.04.2013-)                           | Member          | Bengal Engineering and Science University, Shibpur, Howrah & IEST, Shibpur, Howrah                          |
| Social and Management Sciences<br>Prof. Madhumati Dutta(18.04.2013-)                            | Member          | Bengal Engineering and Science University, Shibpur, Howrah & IEST, Shibpur, Howrah                          |
| Prof. Arup Sarkar<br>Professor and Head, Department of Architecture, Town and Regional Planning | Member          | Bengal Engineering and Science University, Shibpur, Howrah & IEST, Shibpur, Howrah                          |
| Prof. Bhabani Prasad Mukhopadhyay<br>Professor and Head, earth Sc Department                    | Member          | Bengal Engineering and Science University, Shibpur, Howrah & IEST, Shibpur, Howrah                          |
|   |                 |   |



|  |           |  |
|--|-----------|--|
| Prof. Biswarup Basak<br>Professor and Head, Department of Electrical Engineering                   | Member    | Bengal Engineering and Science University, Shibpur, Howrah & IEST, Shibpur, Howrah |
| Prof. Kalyan Kumar Bhar<br>Professor and Head, Department of Civil Engineering                     | Member    | Bengal Engineering and Science University, Shibpur, Howrah                         |
| Prof. Monojit Mitra<br>Associate Professor & Head, Department of Electronics & Tele Communications | Member    | Bengal Engineering and Science University, Shibpur, Howrah                         |
| Prof. Salil Halder<br>Professor & Head, Department of Aerospace Engineering and Applied Mechanics  | Member    | Bengal Engineering and Science University, Shibpur, Howrah                         |
| Prof. Prasanta Kumar Nandy<br>Professor and Head, Department of Chemistry                          | Member    | Bengal Engineering and Science University, Shibpur, Howrah                         |
| Prof. Prabir Kumar Paul,<br>Professor and Head, Department of Mining Engineering                   | Member    | Bengal Engineering and Science University, Shibpur, Howrah                         |
| Prof. Sampad Mukherjee<br>Associate Professor and Head, Physics Department                         | Member    | Bengal Engineering and Science University  |
| Prof. S. P. Maity, Professor and Head,<br>Department of Information Technology                     | Member    | Bengal Engineering and Science University  |
| Prof. Murari Miltra,<br>Professor and Head,<br>Department of Mathematics                           | Member    | Bengal Engineering and Science University  |
| Prof. Sipra Das Bit<br>Professor & Head, Department of Computer Science and Technology             | Member    | Bengal Engineering and Science University  |
| Prof. Sujoy Kumar Saha,<br>HoD Mechanical Engineering  | Member    | Bengal Engineering and Science University  |
| Prof. Sanjoy Sadhukhan<br>HoD Metallurgy and Materials Engineering                                 | Member    | Bengal Engineering and Science University  |
| Prof. Binoy Kumar Dutta<br>Chairman, West Bengal Pollution Control Board                           | Member    | Saltlake, Kolkata  |
| Prof. M.M.Sharma<br>Former Director, Institute of Chemical Technology, Mumbai                      | Member    | Mumbai   |
| Prof. Sekhar Chaudhuri<br>Director, IIM, Calcutta  | Member    | Mumbai   |
| Sri Sukumar Gorai<br>Additional Secretary<br>Higher Education Dept.,<br>Govt. of West Bengal       | Member    | Kolkata  |
| Sri Dipankar Saha<br>Secretary Finance Department,<br>Government of West Bengal                    | Member    | Kolkata  |
| Dr. Biman Bandyopadhyay, Registrar   | Secretary | Bengal Engineering and Science University  |

## Members of the Faculty Council for PG and UG Studies in Engineering and Technology

| Name  | Position  | Address   |
|---|---|---|
| Prof. Ajoy Kumar Ray  | Vice Chancellor [Chairman]/ Director  | Bengal Engineering and Science University, Shibpur, Howrah<br>Ph: 2668 2674, Fax : 2668 7575<br>E-mail : vc@becs.ac.in,<br>ajay_ray2004@yahoo.com |
| <b>Dean</b>   |   |   |
| Prof. Gautam Bandyopadhyay (19.12.2012- 17.04.2013)<br>Prof. Partha Protim Chattopadhyay(18.04.2013-) | Dean of Faculty Council for Post-graduate Studies in Engineering and Technology | Bengal Engineering and Science University, Shibpur, Howrah  |
| <b>The Head or Heads of the Department or Departments</b>   |   |   |
| Aerospace Engineering & Applied Mechanics<br>Prof. Salil Halder                                       | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Architecture, Town & Regional Planning<br>Prof. Souvanic Roy  | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Civil Engineering<br>Prof. K.K. Bhar  | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Computer Science & Technology<br>Prof. Sipra Das (Bit)  | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Electrical Engineering<br>Prof. Biswarup Basak  | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Electronics & Telecommunication Engineering<br>Prof. Monojit Mitra                                    | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Information Technology<br>Prof. S.P.Maity   | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Metallurgy & Materials Science Engineering<br>Prof.Sanjoy Sadhukhan                                   | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Mining Engineering<br>Prof. Prabir Kr. Paul   | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| Mechanical Engineering<br>Prof. Sujoy Kumar Saha  | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| <b>The Directors of Schools</b>   |   |   |
| School of Community Science & Technology<br>Prof. N.R.Bandyopadhyay                                   | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |
| School of Ecology Infrastructure and Human Settlement Management                                      | Member  | Bengal Engineering and Science University, Shibpur, Howrah  |

|   |        |  |
|---|--------|--|
| Prof. Souvanic Roy  |        |  |
| School of Disaster Mitigation Engineering<br>Prof. Ambarish Ghosh             | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| School of Material Science and Engineering<br>Prof. N.R.Bandyopadhyay         | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| School of Mechatronics & Robotics<br>Prof. Aurobinda Roy                      | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| School of Safety & Occupational Health Engineering<br>Prof. B.K.Bhattacharyay | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| School of VLSI Technology<br>Prof. Hafizur Rahaman                            | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Purabi Das School of Information Technology<br>Prof. Arindam Biswas           | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|   |        |  |
| <b>Professors of the Departments</b>  |        |  |
| <b>Aerospace Engineering &amp; Applied Mechanics</b>                          |        |  |
| Prof. Sujay Kumar Mukherjea   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Salil Halder  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|   |        |  |
| <b>Architecture, Town &amp; Regional Planning</b>                             |        |  |
| Prof. Swati Saha  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Aditya Bandyopadhyay  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Arup Sarkar   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Keya Mitra  |        | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Souvanic Roy  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|   |        |  |
| <b>Civil Engineering</b>  |        |  |
| Prof. Ambarish Ghosh  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Anirban Gupta   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Kalyan Kumar Chattopadhyay  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Goutam Bhattacharya   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Subrata Chakraborty   | Member | Bengal Engineering and Science                             |

|  |        |  |
|--|--------|--|
|  |        | University, Shibpur, Howrah                                |
| Prof. Sudip Kumar Roy                                  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|  |        |  |
| <b>Computer Science &amp; Technology</b>               |        |  |
| Prof. Amit Kumar Das                                   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Uma Bhattacharya                                 | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Sipra Das Bit                                    | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Jaya Sil   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Biplab Sikdar                                    | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Susanta Chakraborty                              | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|  |        |  |
| <b>Electrical Engineering</b>                          |        |  |
| Prof. Abhijit Chakraborty                              | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Ashoke Sutradhar                                 | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Biswarup Basak                                   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Gautam Bandyopadhyay                             | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Jagadish Pal                                     | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Prasad Syam                                      | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Abdur Rouf                                       | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Chandan Kumar Chanda                             | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Ashok Kumar Maitra                               | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|  |        |  |
| <b>Electronics &amp; Telecommunication Engineering</b> |        |  |
| Prof. Baidyanath Roy                                   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Dipankar Mukherjee                               | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. S.R.Bhadra Chaudhuri                             | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Debasis Sarkar                                   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|  |        |  |
| <b>Information Technology</b>                          |        |  |

|  |        |  |
|--|--------|--|
| Prof. Hafizur Rahaman  | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| <b>Mechanical Engineering</b>  |        |  |
| Prof. Apurba Kishore Dutta   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Sisir Kumar Guha   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. S. K. Karmakar   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Bijan Kumar Mandal   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Shyamal Chatterjee   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Sujoy Kumar Saha   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Debasis Dutta  | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Somnath Chakraborty  | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| <b>Mining Engineering</b>  |        |  |
| Prof. N.C.Dey  | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. I.N. Sinha   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Prabir Kr. Pal   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Suranjan Sinha   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| <b>Metallurgy &amp; Materials Science Engineering</b>  |        |  |
| Prof. Subrata Chatterjee   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Amitava Basu Mallick   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| <b>Nominee of the Vice Chancellor having special knowledge in the subject or subject concerned</b> |        |  |
| Prof. Mita Nasipuri  | Member | Dept. of Computer Science & Engineering, Jadavpur University<br>Kolkata – 700 032<br>Ph : 9831128131 (M)<br>E-mail : mnasipuri@cscjdvu.ac.in |
| Prof. Niladri Chakraborty  | Member | HOD, Power Engineering<br>Jadavpur University, Kolkata – 700 032<br>Ph : 9830602872 (M)<br>E-mail :<br>chakraborty_niladri2004@yahoo.com     |

|   |   |   |
|---|---|---|
| Prof. S.K.Ray   | Member                                    | Advisor, HIDCO, Salt Lake Stadium Complex<br>Gate No 3, Sector – III<br>Kolkata – 700 091<br>Ph : 9830028022 (M)  |
| Dr.Soumitra Tarafdar  |   | Scientist 'F', Dy. Director, NML<br>Jamshedpur – 831 007  |
| Prof. Tapan Basu  | Member                                    | Advisor, Engg. And Science Aliah University, DN-41, Sector-V, Salt lake, Kol-91   |
| <b>Nominated by the Executive Council having special knowledge in the subject</b> |   |   |
| Vacant  |   |   |
| Prof. Sankhayan Chowdhury   | Member                                    | Dept of Computer Science & Engineering<br>Calcutta University, Senate House<br>87/1, College Street, Kolkata – 700 073<br>Ph: 9433040414 (M), E-mail: sankhayan@gmail.com |
| Prof. Sivaji Chakraborti  | Member                                    | Dept of Electrical Engg, Jadavpur University, Kolkata – 700 032<br>Ph: (0)2414 6948, Email: sivaji@ee.jdvu.ac.in  |
| Dr. Debasis Datta   | Secretary to the Faculty Council (Acting) | Executive Secretary to the Vice Chancellor<br>E-mail address : secy2vc@yahoo.co.in  |
|   |   |   |

## Members of the Faculty Council for PG and UG Studies in Basic & Applied Sciences

| Name                                       | Position  | Address  |
|--|---|--|
| Prof. Ajoy Kumar Ray                       | Vice Chancellor [Chairman]  | Bengal Engineering and Science University, Shibpur, Howrah<br>Ph: 2668 2674, Fax : 2668 7575<br>E-mail : vc@becs.ac.in, ajoy_ray2004@yahoo.com |
| <b>Dean</b>                                |   |  |
| Prof. Binayak S. Choudhury(18.04.2013-)    | Dean of Faculty Council for Post graduate studies in Basic and Applied Sciences | Ph. 033-26684561 to 63<br>Bengal Engineering and Science University, Shibpur, Howrah   |
| <b>The Head or Heads of the Department</b> |   |  |
| Chemistry<br>Prof. Prasanta Kumar Nandi    | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| Mathematics<br>Prof. Murari Mitra          | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| Physics<br>Prof. Mousumi Basu              | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| Earth Sciences<br>Prof. Anannya Biswas     | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| <b>Professors of the Departments</b>       |   |  |
| <b>Chemistry</b>                           |   |  |
| Prof. Bibhotosh Adhikary                   | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Jayati Dutta                         | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Prasanta Nandi                       | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. S.P.Goswami                          | Member  | Bengal Engineering and Science University, Shibpur, Howrah   |
| Prof. Anup Mondal                          | Member  | Bengal Engineering and Science University, Shibpur,  |

|  |        |  |
|--|--------|--|
|  |        | Howrah   |
|  |        |  |
| <b>Earth Sciences</b>                  |        |  |
| Dr. B.P. Mikhopadhyay                  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Earth Sciences<br>Prof. Anannya Biswas | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|  |        |  |
| <b>Mathematics</b>                     |        |  |
| Prof. B.Mukhopadhyay                   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. B.Samaddar Chowdhury             | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. T.K.Roy                          | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. S.K.Majumder                     | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Guruprasad Samanta               | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Ashok Kr. Dhar                   | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Jagabandhu De                    | Member | Bengal Engineering and Science University, Shibpur, Howrah |
|  |        |  |
| <b>Physics</b>                         |        |  |
| Dr. S.S. Sarkar                        | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. Dipali Banerjee                  | Member | Bengal Engineering and Science University, Shibpur, Howrah |
| Prof. B. K. Guha                       | Member | Bengal Engineering and Science University, Shibpur, Howrah |



|   |        |  |
|---|--------|--|
|   |        |  |
| <b>Earth Sciences</b>                               |        |  |
|   |        |  |
| Dr. Ananya Biswas                                   | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
|   |        |  |
| <b>Teachers Elected</b>                             |        |  |
| Dr. Mousumi Basu<br>Dept. of Physics                | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Dr. Pritha Das<br>Dept. of Mathematics              | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Dr. Sudip Kumar Chattopadhyay<br>Dept. of Chemistry | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Dr. Syed Minhaz Hossain<br>Dept. of Physics         | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| Dr. Tapan Kumar Kar<br>Dept. of Mathematics         | Member | Bengal Engineering and Science University, Shibpur, Howrah   |
| <b>Nominee of the Vice Chancellor</b>               |        |  |
| Prof. A.Goswami                                     | Member | Dept. of Mathematics, IIT Kharagpur<br>Kharagpur – 721 302, West Bengal  |
| Prof. Dipak Ghosh                                   | Member | Dept. of Physics, Jadavpur University<br>Kolkata – 700 032<br>Ph : 9831204247 (M)  |
| Prof. Nibir Mondal                                  | Member | Dept. of Earth Science, IISER Kolkata<br>IIT Kharagpur Extension Centre<br>Block – HC, Sector – III, Salt Lake City<br>Kolkata – 700 106 |
| Prof. Samaresh Bhattacharya                         | Member | Dept. of Chemistry, Jadavpur University<br>Kolkata – 700 032   |
| Prof. Sovakar Ganguly                               | Member | Dept. of Mathematics<br>University of Calcutta,<br>Kailasपुरi South of Sethpukur,<br>Barasat, 24pgns (North), Pin-700124                 |
| <b>Nominated by the Executive Council</b>           |        |  |
| Prof. Arghya Deb                                    | Member | Dept. of Physics, Jadavpur University<br>Kolkata – 700 032<br>Ph : 9433426531 (M)  |
| Prof. Jyoti Das                                     | Member | Dept. of Mathematics,  |

|   |  |  |
|---|--|--|
|   |  | University of Calcutta<br>248B, B.B. Chatterjee Road,<br>P.O.-Kasba, Kolkata-42  |
| Prof. Pradip Mohapatra  | Member                                       | Dept. of Chemistry, Jadavpur<br>University<br>Kolkata – 700 032<br>Ph : 9433257808 (M)<br>E-Mail :<br>mppradip@hotmail.com |
| Shri S. N. Datta<br>Deputy Registrar,<br>Ph : 2668 4561 (O)<br>E-mail : dr@becs.ac.in | Secretary to the Faculty<br>Council (Acting) | Bengal Engineering and<br>Science University, Shibpur,<br>Howrah   |
|   |  |  |

## Members of the Faculty Council for PG and UG Studies in Social and Management Sciences

| Name  | Position  | Address   |
|---|---|---|
| <b>Prof. Ajoy Kumar Ray</b><br>Vice Chancellor  | <i>Chairman</i>   | Ph: 2668 2674, Fax : 2668 7575<br>E-mail : vc@becs.ac.in,<br>ajoy_ray2004@yahoo.com                         |
| Prof. Anjan Kumar Ghosh(19.12.2012-17.04.2013)<br>Prof. Madhumati Dutta(18.04.2013-), | Dean of Faculty Council for Post graduate studies in Social and Management Sciences | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur                                    |
| <b>The Head of the Departments</b>  |   |   |
| Prof. M.K.Sanyal , HRM  | Member  | Bengal Engineering and Science University, Shibpur  |
| Prof. Mallika Ghosh<br>Sarbadhikary<br>Humanities                                     | Member  | Bengal Engineering and Science University, Shibpur  |
| <b>The Director of Schools</b>  |   |   |
| <b>School of Management Science</b>   | Vacant  | Bengal Engineering and Science University, Shibpur  |
| <b>The Professor or Professors of the Departments</b>                                 |   |   |
| Prof. P.S.Roy, Humanities   | Member  | Bengal Engineering and Science University, Shibpur  |
| Prof. M.Datta , Humanities  | Member  | Bengal Engineering and Science University, Shibpur  |
| Prof. Aditya Bandyopadhyay, PICSA   | Member  | Bengal Engineering and Science University, Shibpur  |
| <b>Teachers Elected</b>   |   |   |
| Sri Dibyendu Chatterjee<br>Workshop   | Member  | Bengal Engineering and Science University, Shibpur Ph : 9433284629 (M)<br>E-mail : dibyendu_c60@yahoo.co.in |
| Dr. Partha Sarathy Roy<br>Dept. of Humanities   | Member  | Bengal Engineering and Science University, Shibpur  |
| Sri Rupen Basu Mallik<br><br>Dept. of Humanities                                      | Member  | Bengal Engineering and Science University, Ph : 9831313642 (M)<br>E-mail : rbmallik@gmail.com               |

|   |  |  |
|---|--|--|
| Sri Sandip Chattopadhyay<br>Dept. of HRM  | Member                                       | Bengal Engineering and Science University, Ph : 9432183961 (M)   |
| Dr. Zia-ul-Alam<br><br>Dept. of HRM   | Member                                       | Bengal Engineering and Science University, Ph : 9433128404 (M)   |
| <b>Nominee of the Vice Chancellor</b>   |  |  |
| <b>Dr.A.K.Chakraborty</b><br>Former Chairman, West Bengal School Service Commission                               | Member                                       | 14/3B, Jadunath Ukil Road Kolkata – 700 041  |
| <b>Dr. Gautam Sengupta</b><br>Chief Operating Officer & Vice President Kitchen Appliance India Ltd.               |  | Sector V, Block BP, Salt Lake City, Kolkata – 700 091<br>Ph : 9831036663, E-mail : goutamsengupta@videoconmail.com                             |
| <b>Prof. Jayashree Roy</b><br>Dept. of Economics, Jadavpur University   | Member                                       | Jadavpur University<br>Kolkata – 700 032<br>Ph : 2425 7382, 6414 7760  |
| <b>Prof. Ranjit Chakraborty</b><br>Dept. of Management, University of Calcutta                                    | Member                                       | University of Calcutta<br>Alipore Campus, 1, Reformatory Street<br>Kolkata – 700 027   |
| <b>Prof. Subir Chowdhury</b><br>Ex-Director, IIMC   | Member                                       | 50U, Garcha Road,<br>Kolkata – 700 019   |
| <b>Nominated by the Executive Council</b>   |  |  |
| <b>Prof. Ishita Mukherjee</b><br>Dept. of Economics, University of Calcutta                                       | Member                                       | University of Calcutta<br>Senate House, 87/1, College Street<br>Kolkata – 700 073<br>Ph : 9830045339 (M)<br>E-mail : imukhopadhyay@hotmail.com |
| <b>Prof. Nilanjana Gupta</b><br>Dept. of English, Jadavpur University   | Member                                       | Jadavpur University<br>Kolkata – 700 032<br>Ph : 9830543884 (M)<br>E-mail : nilaguptaju@yahoo.com  |
| <b>Prof. Tarun Patra</b><br>Vice Principal & HOD, Dept. of Commerce,<br>Shibpur Dinabandhu Institution (College ) | Member                                       | Shibpur Dinabandhu Institution<br>(College ) Howrah<br>Ph : 9830035346 (M)   |
| Dr. Debasis Datta<br>Executive Sec. to Vice Chancellor  | Secretary to the Faculty Council<br>(Acting) | Bengal Engineering and Science University, Shibpur, Ph. No.- 91-33-2668-4561(extn. no.-212)  |

**MEMBERS OF THE FINANCE COMMITTEE (From July 2012 to 04 September 2012)**

Dr. Ajoy Roy  
Vice Chancellor  
**Chairman**

Two members of the Court: Vacant

Two members of the Court : 1) Dr. Murari Mitra (Dept. of Mathematics)  
2) Dr. Rupen Basu Mallik, HSS

**The Secretary, Department of Higher Education**, Govt. of West Bengal, or his nominee, not below the rank of a Deputy Secretary to the Govt. of West Bengal. - Vacant

**The Secretary, Department of Finance**, Govt. of West Bengal, or his nominee, not below the rank of a Deputy Secretary to the Govt. of West Bengal - Vacant

Dr.B.Bandyopadhyay, **Registrar**

**One expert in the financial management, nominated by the State Govt.**

Sri R. N. Ray  
Accounts Officer & Ex Officio Deputy Secretary  
H E Dept Govt. of WB

Sri M. N. Sarkar,  
Finance Officer  
**Secretary**

## MEMBERS OF THE PLANNING & MONITORING BOARD

| Name  | Position | Address   |
|---|----------|---|
| Prof. Ajoy Kumar Ray  | Chairman | Ph: 2668 2674, Fax: 2668 7575<br>E-mail: vc@becs.ac.in,<br>ajoy_ray2004@yahoo.com |
| Prof. Gautam Bandyopadhyay (19.12.2012-17.04.2013)<br>Prof. Partha Protim Chattopadhyay (18.04.2013-Dean Faculty of Engg & Tech         | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Prof. S. P. Goswami (19.12.2012- 17.04.2013)<br>Prof. Binayak S. Choudhury(18.04.2013-Dean Faculty of Basic & Applied Sc.s              | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Prof. Anjan Kumar Ghosh(19.12.2012-17.04.2013)<br>Prof. Madhumati Dutta(18.04.2013-),<br>Dean Faculty of Social and Management Sciences | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Prof. N. C. Dey, Dept. of Mining Engg, Nominees of the Executive Council  | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Dr. N. R. Bandyapadhyay, School of Material Sc.& Engg, Nominees of the Executive Council  | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Prof. Rupen Basu Mullick<br>Dept. of Humanities, Nominees of the Faculty Council  | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Prof. Souvonic Roy<br>School of Eco. Infrastructure & Human Settlement Mgmt., Nominees of the Faculty Council                           | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Dr. Tapan Kumar Roy<br>Dept. of Math, Nominees of the Faculty Council   | Member   | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Secretary, West Bengal State Council of Higher Education  | Member   | Kolkata   |
| One member nominated by the State Govt.   | Member   | Kolkata   |
| Dr.B.Bandyopadhyay, Registrar   | Convenor | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |
| Shri Subrata Kar, University Engineer   | Invitee  | Phone: 26684561-63<br>Bengal Engineering and Science University, Shibpur          |

### **The Members of the Library Committee**

The Vice Chancellor or his nominee - Chairman

The Deans of the Faculty Councils:

Dean Faculty of Engg & Tech

Prof. Gautam Bandyopadhyay (19.12.2012- 17.04.2013)

Prof. Partha Protim Chattopadhyay (18.04.2013-

Dean Faculty of Basic & Applied Sc.s

Prof. S. P. Goswami (19.12.2012- 17.04.2013)

Prof. Binayak S. Choudhury(18.04.2013-

Dean Faculty of Social and Management Sciences

Prof. Anjan Kumar Ghosh(19.12.2012- 17.04.2013)

Prof. Madhumati Dutta(18.04.2013-

All Heads of Departments of the three Faculty Councils :

(i) Faculty Council for Engineering & Technology

- HOD of Civil Engineering - Member
- HOD of Mechanical Engineering - Member
- HOD of Electrical Engineering - Member
- HOD of Computer Sc. & Tech. - Member
- HOD of Information Technology - Member
- HOD of Architecture, T & RP - Member
- HOD of Aerospace & Applied Mechanics - Member
- HOD of Electronics & Telecommunication - Member
- HOD of Metallurgy & Materials Engineering - Member
- HOD of Mining Engineering - Member

(ii) Faculty Council for Basic & Applied Sciences

- HOD of Mathematics - Member
- HOD of Physics - Member
- HOD of Chemistry - Member
- HOD of Geology - Member

(iii) Faculty Council for Social & Management Sciences

- HOD of Humanities - Member
- HOD of Human Resource Management - Member

Dr. H. P. Sharma - Secretary

Dy. Librarian, in charge of Library

## **Students' Welfare Board**

(a) Prof. Ajoy Kumar Ray - Chairman  
Vice Chancellor

(b) The Deans of the Faculty Councils:

Prof. Amit Kumar Das (- 18.12.2012)  
Prof. Gautam Bandyopadhyay (19.12.2012- 17.04.2013)  
Prof. Partha Protim Chattopadhyay (18.04.2013 -  
Dean Faculty of Engg & Tech

Prof. B. K. Guha ( - 18.12.2012)  
Prof. S. P. Goswami (19.12.2012- 17.04.2013)  
Prof. Binayak S. Choudhury (18.04.2013-  
Dean Faculty of Basic & Applied Sc.s

Prof. M. K. Sanyal (- 18.12.2012)  
Prof. Anjan Kumar Ghosh (19.12.2012- 17.04.2013)  
Prof. Madhumati Dutta (18.04.2013-  
Dean Faculty of Social and Management Sciences

(c) The Professor of Training and Placement - Member

(d) Three Superintendents of Hostels nominated by the Vice Chancellor:

- (i) Prof. Subrata Chatterjee - Member
- (ii) Prof. Bhabani Prasad Mukhopadhyay - Member
- (iii) Prof. Santanu Kumar Karmakar - Member

(e) President of each of the Students' Union:

- (i) President of UG Students' Union - Member
- (ii) President of PG Students' Union - Member

(f) One alumnus nominated by the Executive Council:

Shri Asish Sen - Member  
Plant Superintendent, Padmapukur Water Treatment Plant, Howrah

(g) Prof. Anjan Kumar Ghosh (07.12.1999- 30.04.2013)  
Prof. Aditya Bandyopadhyay (01.05.2013- )  
- Secretary  
Professor-in-charge of Students' Activities



## **Students' Sports Board**

(a) Prof. Ajoy Kumar Ray - Chairman  
Vice Chancellor

(b) The Deans of the Faculty Councils :

Dean Faculty of Engg & Tech

Prof. Gautam Bandyopadhyay (19.12.2012- 17.04.2013)

Prof. Partha Protim Chattopadhyay (18.04.2013-

Dean Faculty of Basic & Applied Sc.s

Prof. S. P. Goswami (19.12.2012- 17.04.2013)

Prof. Binayak S. Choudhury (18.04.2013-),

Dean Faculty of Social and Management Sciences

Prof. Anjan Kumar Ghosh (19.12.2012- 17.04.2013)

Prof. Madhumati Dutta (18.04.2013- ),

(c) The Professor of Training and Placement - Member

(d) Three Superintendents of Hostels nominated by the Vice Chancellor:

(i) Prof. Aditya Bandyopadhyay - Member

(ii) Prof. Anindita Sengupta - Member

(iii) Prof. Nityananda Nandi – Member

(e) Two Physical Instructors:

(i) Dr. Zia-Ul-Alam - Member

(ii) Shri Sandip Chattopadhyay - Member

(f) President of each of the Students' Union:

(i) President of UG Students' Union - Member

(ii) President of PG Students' Union - Member

(g) One alumnus nominated by the Executive Council:

Shri Asish Sen - Member

Plant Superintendent, Padmapukur Water Treatment Plant, Howrah

(h) Prof. Aditya Bandyopadhyay (01.05.2013-)

- Secretary

Professor-in-charge of Students' Activities

## **Name of Dept., Centers and Schools, Heads of the Dept. and Professor-in-charge**

### **Name of Departments**

1. Aerospace Engineering and Applied Mechanics
2. Architecture, Town and Regional Planning
3. Chemistry
4. Civil Engineering
5. Computer Science & Technology
6. Electrical Engineering
7. Electronics & Tele Communication
8. Earth Sciences
9. Humanities and Social Sciences
10. Human Resource Management
11. Information Technology
12. Mathematics
13. Mechanical Engineering
14. Metallurgy And Materials Engineering
15. Mining Engineering
16. Physics
17. Dept. of Students' Activities

### **Name of the Schools**

1. Purabi Das School of Information Technology (PDSIT)
2. School of Materials Science & Engineering (SMSE)
3. School of Management Sciences (SOMS)
4. School of Community Science and Technology (SOCSAT)
5. School of Disaster Mitigation Engineering (SDME)
6. School of Ecology, Infrastructure & Human Settlement Management (SEIHSM)
7. School of Mechatronics & Robotics (SM&R)
8. School of Safety & Occupational Health Engineering (SSOH)
9. School Of VLSI Technology (SOVLSIT)

### **The Center in the university**

1. Computer Centre
2. Video Conferencing Facility
3. Centre of Excellence

### **Centre of Excellence**

1. Health Care Science and Technology  
Coordinator - Professor Jayanta Chakraborty
2. Green Energy and Sensor Systems  
Coordinator - Professor Hiranmoy Saha

### **Name of the Heads of Departments**

1. Aerospace Engineering and Applied Mechanics – Prof. Salil Halder
2. Architecture, Town and Regional Planning - Prof. Arup Sarkar
3. Chemistry - Prof. Prasanta Kumar Nandi
4. Civil Engineering - Prof. Kalyan Kr. Bhar
5. Computer Science & Technology - Prof. Sipra Das (Bit)
6. Electrical Engineering - Prof. Biswarup Basak
7. Electronics & Tele Communication – Prof. Monojit Mitra
8. Geology - Prof Bhabani Prasad Mukhopadhyay
9. Humanities and Social Sciences - Prof. Mallika Ghosh Sarbadhikary

10. Human Resource Management - Prof. Manas Kumar Sanyal
11. Information Technology - Prof. S.P. Maity
12. Mathematics - Prof. Murari Mitra
13. Mechanical Engineering - Prof. Sujay Kumar Saha
14. Metallurgy And Materials Engineering - Prof. Sanjoy Sadhukhan
15. Mining Engineering - Prof. Prabir Kumar Paul
16. Physics - Prof. Sampad Mukherjee
17. Dept. of Students' Activities – Prof. Aditya Bandyopadhyay

**Name of the Directors / Professor-in –charge of Schools**

1. Purabi Das School of Information Technology - Prof. Arindam Biswas
2. School of Materials Science & Engineering - Prof. Subrata Chatterjee
3. School of Management Sciences - Prof. Rupen Basu Mallik
4. School of Community Science and Technology - Prof. Sujay Mukherjee
5. School of Disaster Mitigation Engineering - Prof. Ambarish Ghosh
6. School of Ecology, Infrastructure & Human Settlement Management - Prof. Sudip Kumar Roy
7. School of Mechatronics & Robotics –Prof. Debjani Ganguly
8. School of Safety & Occupational Health Engineering - Prof. B.K.Bhattacharya
9. School Of VLSI Technology - Prof. Hafizur Rahman
10. Director of Research and Consultancy – Prof. S. Chatterjee

**Distinguished Professors who have joined this University in recent period:**

1. Steel Chair Professor  
Dr. (Prof.) Subir Kumar Bhattacharyya  
Department: Metallurgy And Materials Engineering
2. Bijoy Ashu Chair Professor  
Prof. Madhujit Mukhopadhyay  
Department: Civil Engineering  
Ph. No. : 033 2422 8047 (Ext. No.-371), (M)-9831171782  
e-mail address : mmadhujit@yahoo.com, mmadhujit@gmail.com
3. Honorary Emeritus Scientist  
Prof. Chitta Ranjan Mahata
4. Honorary Distinguished Professor  
Prof. Amitabha Ghosh  
Former Director, IIT Kharagpur,  
Senior Scientist, Indian National Science Academy, BESUS  
and Honorary Distinguished Professor, IIT Kanpur  
Ph. No.: (O)- 033 2668 0521 (Ext. No.-441), (R)-2668 2424  
e-mail address : [amitabha@iitk.ac.in](mailto:amitabha@iitk.ac.in)
5. Honorary Distinguished Professor  
Prof. Asok Kumar Mallik  
Former Professor, IIT Kanpur
6. Honorary Emeritus Profesor  
Prof. Asok Kumar Barua
7. Metalogic Systems Emeritus Chair of the Centre of Excellence-in memory of Professor Sankar Sebak Baral  
Prof. Hiranmoy Saha

1. Prof. C.R. Mahata  
Honorary Emeritus Scientist, BESUS
2. Dr. Nikhilesh Bandyopadhyay  
Former HOD, Coated Product Group, Tata Steel, Jamshedpur  
As Tata Steel Chair Professor, Dept. of Metallurgy and Materials Engineering, BESUS
3. Prof. Sabyasachi Sarkar  
Former Professor of Chemistry, IIT, Kanpur  
As Honorary Emeritus Professor, BESUS
4. Dr. Dipankar Chakraborty  
Former Professor and HOD, Dept. of Electronic and Telecommunication Engineering, BESUS  
As Adjunct Professor, Centre for Health Care Science and Technology
5. Prof. Shankar lall Maskara  
Former HOD, Dept. of E & TC, IIT, Kharagpur  
As Adjunct Professor, Department of E & TC , BESUS
6. Prof. Achintya Haldar  
Professor of Civil Engineering and EM & da Vinci Fellow  
University of Arizona, Tuscon, USA  
As Honorary Distinguished Visiting Professor of BESUS
7. Prof. Srikumar Mallick  
Former HoD of Electrical Engineering  
As Adjunct Professor of Electrical Engineering Department of BESUS
8. Prof. U. K. Chatterjee  
As Adjunct Professor, Department of Metallurgy and Materials Engineering of BESUS
9. Prof. Jayanta Kumar Chakraborty  
Former Professor of AE & AM, BESUS  
As Adjunct Professor, Centre for Health Care Science and Technology
10. Dr. S. P. Gon Chaudhuri  
Former Director of Institute of Cultivation of Science  
As Adjunct Professor of CEGESS, BESUS

## **Professor-in-Charge**

1. International Relations and Alumni Affairs of the university : Prof. Santanu Kumar Karmakar
2. Computer Networking : Prof. Manas Hira
3. Library : Prof. Sudip Kumar Chattopadhyay
4. Furniture: Prof. Sudipta Mukhopadhyay

### **Dean**

- Dean of Faculty of Engg. and Technology  
Prof. Gautam Bandyopadhyay (19.12.2012- 17.04.2013)  
Prof. Partha Protim Chattopadhyay(18.04.2013-till)
- Dean of Faculty of Basic and Applied Sciences  
Prof. S. P. Goswami (19.12.2012- 17.04.2013)  
Prof. Binayak S. Choudhury(18.04.2013-till),

- Dean of Faculty of Social and Management Sciences  
Prof. Anjan Kumar Ghosh(19.12.2012- 17.04.2013)  
Prof. Madhumati Dutta(18.04.2013-till),

## **The Administrative Staff**

### **Vice Chancellor**

Prof. Ajoy Kumar Ray  
Ph. No.- 91-33-2668-4561(extn. no.-211)  
E-mail address : vc@becs.ac.in, ajoy\_ray@yahoo.com

### **Registrar**

Dr. Biman Bondopadhyay  
Ph. No.- 91-33-2668-4561(extn. no.-215) Direct : 26681503  
E-mail address : regis@becs.ac.in

### **Finance Officer**

Shri Manindra Nath Sarkar  
Ph. No.- 91-33-2668-4561(extn. no.-216)  
E-mail address : fo\_mns@yahoo.com

### **Controller of Examinations (Acting)**

Dr. Nirmalaya Bhattacharya  
Ph. No.- 91-33-2668-0637(extn. no.-356), Mob.No.:  
E-mail address :

### **Deputy Registrar**

Shri Sambhunath Dutta  
Ph. No.- 91-33-2668-4561(extn. no.-201)  
E-mail address : dattasn@gmail.com

### **Development Officer**

Dr. Biman Das  
Ph.No. - 91-33-2668-4561(extn. no.-642), Mob. No.- 91-9874407303

### **University Engineer**

Shri Subrata Kar  
Ph.No. - 91-33-2668-4561(extn. no.-345)

### **Deputy Librarian**

Dr. Hari Prasad Sharma  
Ph. No.- 91-33-2668-4561,(extn. no.-284)  
E-mail address : sharma\_hp@hotmail.com

### **Deputy Controller of Examinations**

Dr. Nirmalya Kumar Bhattacharyya  
Ph. No.- 91-33-2668-4561, (extn. no.-629) Mob. No.- 91- 9831212905  
E-mail address : bnirmalya@rediffmail.com

### **Executive Secretary to V.C.**

Dr. Devasis Datta  
Ph. No.- 91-33-2668-4561(extn. no.-212)  
E-mail address : secy2vc@yahoo.co.in

### **Assistant Proctor**

Shri Alok Kr Mitra

Ph. No.- 91-33-2668-4561(extn. no.-276), Mob. No.: 9830519575  
E-mail address : akmitra7077@yahoo.co.in

**Assistant Registrar**

Shri Shib Sankar Basak.

Ph. No.- 91-33-2668-4561(extn. no.-378)

E-mail address : shibu9355@yahoo.co.in, arssb@becs.ac.in

**Assistant Registrar**

Shri Bivore Das

Ph. No.- 91-33-2668-4561, (extn. no.-643) Mob.No.: 09433956878

E-mail address : bibhor.das@gmail.com, arbd@becs.ac.in

**Audit Officer**

Shri Alok kr.Maity

Ph. No.- 91-33-2668-4561(extn. no.-206)

E-mail address : auditofficer@office.becs.ac.in

**Accounts Officer**

Shri Kartick Samanta

Ph.No. - 91-33-2668-4561(extn. no.-232)

**Assistant Training Officer**

Shri Usha Shankar Bhattacharyya

Ph.No. - 91-33-2668-4561(extn. no.-268)

**Assistant Librarian**

Smt. Subhra Bose

Ph. No.- 91-33-2668-4561,(extn. no.-289), Mob. No. : 91-9433928509

**Assistant Librarian**

Shri Sushil Kumar Barman

Ph. No.- 91-33-2668-4561,(extn. no.-291)

**Assistant Librarian**

Smt. Sushmita Chakraborty

Ph. No.- 91-33-2668-4561,(extn. no.-290), Mob. No. : 91-9830710918

E-mail address : susmitachakraborty94@gmail.com

**Assistant Librarian**

Sri Abani Oraon

Ph. No.- - 91-33-2668-4561,(extn. no.-725)

E-mail address : abani,oraon@yahoo.co.in

**Assistant Controller**

Sri Dipankar Chakraborty

Ph.No. - 91-33-2668-4561(extn. no.-640), Mob. No. : 91-9830182266

E-mail address : dcosd@yahoo.co.in

**Professor-in-Charge of Students' Activities**

Prof. Aditya Bandyopadhyay (01.05.2013- )

Ph.No. - 91-33-2668-4561(extn. no.-276),



*Department of  
Aerospace engineering  
&  
Applied Mechanics*





## About the department

The department of Applied Mechanics was established as a separate major engineering department in 1947 and subsequently the Drawing Section was attached to it in late fifties. Over the years the department garnered enough human resources in the areas of fluid mechanics and structures. With effect from 2008 the department has been renamed as the Department of Aerospace Engineering and Applied Mechanics. The department runs regular postgraduate programme in Engineering Mechanics and started undergraduate programme in Aerospace Engineering from the academic session 2010 – 11 with an approved intake of 30 students.

### Academic Programmes:

#### Undergraduate Level:

- i. Degree offered : B.E. in Aerospace Engineering
- ii. Sanctioned students intake : 30
- iii. Additional intake through lateral entry : Nil.

#### Postgraduate Level:

- i. Degree offered : M.E. in Engineering Mechanics
- ii. Sanctioned students intake : 54
- iii. Additional intake through other programmes : Nil.
- iv. Specialisations in : Mechanics of Solid & Mechanics of Fluid.

#### Doctoral Level :

- i. Degree offered: Ph.D.
- ii. No. of candidates enrolled : 6  
Registered: 2 in 1<sup>st</sup> year  
6 in 2<sup>nd</sup> year  
5 in 3<sup>rd</sup> year

### Faculty position:

Sanctioned faculty post: 27

Vacant post: 11

#### Faculty Profile:

| Name               | Designation | Highest Qualification | Specialisation/ Research Area                   | Contact No.<br>E-mail  |
|--------------------|-------------|-----------------------|---|--|
| Dr. S. Bhaumik     | Professor   | Ph.D.                 | Robotics, Mechatronics, Automation, Fluid Power | 9836044278<br><a href="mailto:sbhaumik@lycos.com">sbhaumik@lycos.com</a>   |
| Dr. S.K. Mukherjea | Professor   | Ph.D.                 | FM, CFD   | 9831209985<br><a href="mailto:mksujay@gmail.com">mksujay@gmail.com</a><br><a href="mailto:mksujay@lycos.com">mksujay@lycos.com</a><br><a href="mailto:skmukherjea@appmech.becs.ac.in">skmukherjea@appmech.becs.ac.in</a> |
| Dr. S. Halder      | Professor   | Ph.D.                 | Solid Mech., FEM                                | 9830671153<br><a href="mailto:salilhalدار@lycos.com">salilhalدار@lycos.com</a>   |

|                       |                        |                |  |  |
|-----------------------|------------------------|----------------|--|--|
| Dr. K. Debnath        | Professor              | Ph.D.          | Fluid Dynamics,<br>Hydraulics  | 9830434409<br><a href="mailto:debnath_koustuv@yahoo.com">debnath_koustuv@yahoo.com</a>   |
| Dr. A. Roychowdhury   | Professor              | Ph.D.          | Biomechanics,<br>Solid Mechanics,<br>FEA   | 9830465710<br><a href="mailto:arc_98@rediffmail.com">arc_98@rediffmail.com</a>           |
| Dr. S. Majumder       | Professor              | Ph.D.          | Solid Mechanics,<br>Biomechanics   | 9433477867<br><a href="mailto:majumder.santanu@gmail.com">majumder.santanu@gmail.com</a> |
| Dr. R. Roy            | Professor              | Ph.D.          | Earthquake Engg,<br>Soilstructure<br>interaction   | 9433154976<br><a href="mailto:rroybec@yahoo.com">rroybec@yahoo.com</a>                   |
| Dr. A.K. Bhattacharya | Associate<br>Professor | Ph.D.          | Hyd. , Water<br>Resources Engg.  | 9831046091<br><a href="mailto:amartyakumar@yahoo.co.in">amartyakumar@yahoo.co.in</a>     |
| Dr. B. Bhattacharyya  | Associate<br>Professor | Ph.D.          | Numerical<br>Methods,<br>Biomechanics  | 9433235720<br><a href="mailto:basubec@yahoo.com">basubec@yahoo.com</a>                   |
| Dr. M.C. Manna        | Associate<br>Professor | Ph.D.          | Vibration,<br>Dynamics   | 9433228694<br><a href="mailto:mcmbecdu@lycos.com">mcmbecdu@lycos.com</a>                 |
| Dr. N. Nandi          | Associate<br>Professor | Ph.D.          | Hyd. , Water<br>Resources Engg.  | 9830354744<br><a href="mailto:nityananda@mailcity.com">nityananda@mailcity.com</a>       |
| Dr. P.K. Das          | Associate<br>Professor | Ph.D.          | Earthquake Engg,<br>Struc. Dyn.  | 7890099664 / 9433429156<br><a href="mailto:drpkdbesu@gmail.com">drpkdbesu@gmail.com</a>  |
| Sri N. Khutia         | Assistant<br>Professor | M.E.           | FE, Frac.Mech.,<br>FPC   | 9883263316<br><a href="mailto:niloy@mailcity.com">niloy@mailcity.com</a>                 |
| Sri D. Pal            | Assistant<br>Professor | M.E.           | CFD,<br>Microfluidics,<br>Fluid Mechanics &<br>Thermal<br>Engineering                                      | 9432311430<br><a href="mailto:debashispal_2000@yahoo.com">debashispal_2000@yahoo.com</a> |
| Dr. P. Halder         | Assistant<br>Professor | Ph.D.          | CFD, High Speed<br>Compressible<br>Flows<br>(Hypersonics),<br>Magnetohydrodyna<br>mics, Aero<br>Propulsion | 9836277025/<br>9434368954<br><a href="mailto:pabimeri@gmail.com">pabimeri@gmail.com</a>  |
| Sri K. Bhowmik        | Assistant<br>Professor | M.Sc<br>(Engg) | Solid Mechanics,<br>FEM  | 9051327240<br><a href="mailto:Krishnendu.besu@gmail.com">Krishnendu.besu@gmail.com</a>   |

#### Research Area:

- Analysis of structures under different loading
- Fluid Dynamics and Turbulence
- Computational Fluid Dynamics
- Applications of Finite Element Method
- Biomechanics
- Robotics and Mechatronics
- Earthquake Engineering, Dynamic Soil-structure interaction.

## h. Dynamics of Structures

### i. Micro and nanoscale Transport Processes

#### **Research facilities:**

- i. Material Testing using UTM
- ii. Implant Testing using Knee Joint Simulator
- iii. Dynamic Analysis of Gait using Kistler Force Platform & Barograph
- iv. Dynamic Model Testing using Shaker Table
- v. Aerodynamic Model Testing using Wind Tunnel.
- vi. Tilting Flume.
- vii. Micro-Acoustic Doppler Velocimeter (16 MHz).
- viii. Compressible Flow Bench
- ix. Nozzle Pressure Distribution Measuring Setup
- x. Nozzle Performance Experimental Setup

#### **Name of the Laboratories:**

- |    |                                  |                |
|----|----------------------------------|----------------|
| 1  | Strength of Materials Lab        |                |
| 2  | Fluid Mechanics & Hydraulics Lab |                |
| 3  | Biomechanics Lab                 |                |
| 4  | CAD Lab                          |                |
| 5  | Viscous Fluid Flow Lab           | : Est. in 2011 |
| 6  | Low Speed Aerodynamics Lab       | : Est. in 2012 |
| 7  | Aerospace Structure Lab          | : Est. in 2012 |
| 8  | Thermodynamics Lab               | : Est. in 2013 |
| 9  | Propulsion Lab                   | : Proposed     |
| 10 | High Speed Aerodynamics Lab      | : Proposed     |
| 11 | Jet Propulsion Lab               | : Proposed     |
| 12 | Mechanical Vibration Lab         | : Est. in 2012 |
| 13 | Stability and Control Lab        | : Proposed     |
| 14 | Computation Lab                  | : Proposed     |

#### **Consultancy Work :**

Design of two chimneys of 40 m and 75 m height, of DESCON Consultancy Services.

Project on Entrepreneurship Development Cell (along with HRM Deptt.) (Sponsoring Agency – AICTE).

Project on Centre for green TBI (Sponsoring Agency - NSTEDB, DST, Govt. of India).

Calibration of Flowmeter (Kolkata Municipal Corporation)

Consultancy in Fan Vibration Analysis in Cooling tower for Paharpur Cooling Towers Ltd., Kolkata, India. September, 2014.

**Support staff position :**

Sanctioned technical post :

Technical Assistant – 7 (vacant – 6)

Laboratory Assistant – 3

Instrument Mechanic – 1

Mechanic – 1 (vacant – Retd. on January, 2014)

Draughtsman – 1 (vacant)

**Technical staff profile**

| Name               | Designation           | Highest Qualification | Contact No. | E-mail   |
|--------------------|-----------------------|-----------------------|-------------|--|
| Asis Ghosh         | Laboratory Assistant  | B. Sc.                | 9433477829  | <a href="mailto:g_asis1@yahoo.co.in">g_asis1@yahoo.co.in</a>                     |
| Arun Kr. Nandi     | Laboratory Assistant  | B. Sc.                | 9433452131  | <a href="mailto:asttn.56@gmail.com">asttn.56@gmail.com</a>                       |
| Sharmila Sengupta  | Laboratory Assistant  | M. Sc.                | 9836031804  | <a href="mailto:ssg1956@gmail.com">ssg1956@gmail.com</a>                         |
| Amalendu Sahoo     | Technical Assistant I | M. E.                 | 9432647772  | <a href="mailto:Sahoo_amalendu@rediffmail.com">Sahoo_amalendu@rediffmail.com</a> |
| Jayanta Kundu      | Instrument Mechanic   | H.S. (Sc. & Tech.)    | 9830456467  | <a href="mailto:JKKUNDUJAYANTA@gmail.com">JKKUNDUJAYANTA@gmail.com</a>           |
| Narayan Ch. Ghosal | Sr. Mechanic          | Upto Class X          | 9051426136  | ( Retd. on 31.01.2014 )  |

**Sponsored Research :**

| Sl. No. | Title of Research Project  | Sponsoring Agency            | Amount sanctioned Rs. in lakhs |
|---------|--|------------------------------|--------------------------------|
| 1       | DST-FIST Project   | DST                          | 98.5                           |
| 2       | Inelastic Response of Reinforced Concrete Structures during Severe Earthquake  | BRNS, BRC Mumbai             | 7.14                           |
| 3       | Computer Aided Design, Analysis and Development of Patient Specific Prosthesis for different Human Joints, specially Hip Joint on Indian Perspective |                              | 6.9                            |
| 4       | Guideline Development for Bridge Pier Scour in Cohesive Bedded Rivers  | DST, N. Delhi                | 24                             |
| 5       | Turbulence in rough bed free surface flow using double averaged Navier Stokes Equations  | DST, N. Delhi                | 30                             |
| 6.      | Development of a Sensor Integrated Multifingered Dexterous Robot Hand with Data Glove Interfacet   | BRNS, Dept. of Atomic Energy | 61.38                          |

**Industry – Institute Interaction :**

Organised one day “Workshop on Aeromodelling” jointly with Aeronautical Society of India, Kolkata branch on 5<sup>th</sup> September, 2013.

**No. of publications :** ( Listed below )

### **Seminar/ Workshops/ Conferences/ Training programme organized by the department**

Organised one day “Workshop on Aeromodelling” jointly with Aeronautical Society of India, Kolkata branch on 5<sup>th</sup> September, 2013.

ISTAM – 2013 – 58TH Congress of The Indian Society of Theoretical and Applied Mechanics (ISTAM), An International Meet, held in December 18 - 21, 2013, in Bengal Engineering and Science University, Shibpur, West-Bengal, India.

### **Advancements under TEQIP – Phase II**

1. **Instrument name:** “Aircraft Longitudinal Roll and Yaw Control Experimental Set up” for Aircraft Stability and Control Laboratory funded by TEQIP (Cost. Rs. 4,93,666/-) December, 2013

2. **Instrument Name:** “Quad rotor Aircraft Experimental Setup”-for Aircraft Stability and Control Laboratory funded by TEQIP (Cost. Rs. 2,13,542/-) December, 2013

3. **Instrument Name:** “Wind Tunnel Project Based On Flow Visualization Techniques & Data Reporting” funded by UGC XII Plan (Cost. Rs. 9,82,639/- inclusive cost of Instrument No. 4), June 2014

4. **Instrument Name:** : “Aeromodel Laboratory Development” funded by UGC XII Plan, June 2014

### **Foreign visits and Invited Lectures :**

1. Attended and Presented a Conference paper in “*Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2014)*”, Nara, Japan from 10 to 13 October, 2014.

2. Chair a Conference Session in “*Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2014)*”, Nara, Japan from 10 to 13 October, 2014.

### **Visitors to Department (Indian & Foreign) :**

1. Professor A.K. Ghosh, Dept. of Aerospace Engg., IIT, Kanpur

2. Professor C. Upadhyay, Dept. of Aerospace Engg., IIT, Kanpur

3. Professor Ishan Sharma, Dept. of Mechanical Engg., IIT, Kanpur

4. Professor B.S. Majumder, Retired Professor, ISI Kolkata.

5. Professor Arun Mishra, Chairman, Dept. of Mechanical and Aerospace Engg., McGill University, Montreal, Canada.

**Training and Placement :** 7 students out of 9 were selected for 10 different industries.

### **New Academic/ Research Initiatives**

#### **Academic collaboration**

Jointly guided Master’s Thesis with CSIR Lab at National Materials Laboratory, Jamshedpur, India.

## **Publications : 2013 – 2014**

### **Journal Publications :**

1. Kanak Kalita, Abhir Banerjee and **Salil Halder** “An analysis to mitigate induced principal stresses in orthotropic plates”, International Journal of Engineering Research & Technology, Vol. 6, No. 3, ISSN 2319-3182, September 2013.
2. **Debnath, K.**, and Chaudhury, S. Manik, M., K. (2013). “Local scour around abutment in clay/sand-mixed cohesive sediment bed” ISH Journal of Hydraulic Engineering, Taylor and Francis, DOI: 10.1080/09715010.2013.835103
3. **Majumder, S., Roychowdhury, A.**, Pal, S., 2013. Hip fracture and anthropometric variations: Dominance among trochanteric soft tissue thickness, body height and body weight during sideways fall. Clinical Biomechanics (Elsevier Science), Volume 28, Issue 9-10, Pages 1034-1040. DOI: 10.1016/j.clinbiomech.2013.09.008
4. **Khutia N.**, Dey P.P., Paul Surajit, Tarafder S., (2013) Development of Non Masing Characteristic Model for LCF and Ratcheting Fatigue Simulation of SA333 C-Mn Steel, Mechanics of Materials, Elsevier, 65, 88-102, 2013.
5. Chatterjee, D., Mondal, B. and **Halder, P. (2013)**; "Unsteady Forced Convection Heat Transfer over Semicircular Cylinder at Low Reynolds Numbers", Numerical Heat Transfer Part A, 63: 411-429.
6. Chatterjee, D., **Halder, P.**, Mondal, S. and Bhattacharjee, S. (2013); "Magnetoeconvective transport in a vertical lid-driven cavity including a heat conducting square cylinder with Joule heating", Numerical Heat Transfer Part A, 64: 1050-1071.
7. **Halder, P.**, De, S., Sinhamahapatra, K.P. and Singh, N. (2013), "Numerical Simulation of Shock-Vortex Interaction in Schardin's Problem", Shock Waves, 23: 495–504.
8. Kalita, K. and **S. Halder** “Static Analysis of Transversely Loaded Isotropic and Orthotropic Plates with Central Cutout”, Journal of The Institution of Engineers (India) : Series C : 1-12, 2014.
9. Biswas, J.K., Karmnagar, S.K., **Majumder, S.**, Banerjee, P.S., Saha S., **Roychowdhury, A.**, 2014. Optimization of spinal implant screw for lower vertebra through finite element studies. Journal of Long-Term Effects of Medical Implants (Beggel House), Volume 24, Issue 2-3, Pages 99-108. DOI: 10.1615/JLongTermEffMedImplants.2014006264.
10. **Roy, R.**, Thakur, P and Chakraborty S. (2014). “Spectral Matching of Real Ground Motions: Applications to Horizontally Irregular Systems in Elastic Range”, Advances in Structural Engineering, Multi-Science, U.K., Vol. 17, No. 11, pp. 1623-1638.
11. **Roy, R.**, Thakur, P and Chakraborty S. (2014). “Scaling of Ground Motions and Its Implications to Plan-asymmetric Structures”, Soil Dynamics and Earthquake Engineering, Elsevier, Vol. 57, No. 1, pp. 46-67.
12. Dutta, I. and **Debnath, K.** (2014). “Volume of fluid model of open channel contraction.” Journal of the Institution of Engineers (India): Series C, Springer, (Accepted).

13. Roy S., Chatterjee, A and **Debnath, K.** (2014). "Numerical study of turbulence characteristics over rough bed." International Journal on Theoretical and Applied Research in Mechanical Engineering,, 3(1), 44-49.
14. Bandopadhyay, A., Ghosh, U., **Pal, D.**, Chaudhury, K., and Chakraborty, S. (2014) "Electrokinetic Maneuvering of Bubble-Driven Inertial Micro-Pumping Systems", International Journal of Micro-nano Scale Transport, Vol. 5, No. 1, pp. 13-21.
15. Roy S., Panda D., **Khutia N., RoyChowdhury A.**, (2014), Pore geometry optimization of titanium (Ti6Al4V) alloy, for its application in the fabrication of customized hip implants, International Journal of Biomaterials, Hindawi Publishing Corporation, **Accepted**.
16. **Khutia N.**, Dey P. P., Sivaprasad S., Tarafder S., 2014. Development of new cyclic plasticity model for 304LN stainless steel through simulation and experimental investigation. Mechanics of Materials, Elsevier, Volume 78, Pages 85-101.
17. **Khutia, N.** and Dey, P.P. (2014) 'Material parameter optimisation of Ohno-Wang kinematic hardening model using multi objective genetic algorithm', *Int. J. Computational Materials Science and Surface Engineering*, Vol. 6, No. 1, pp.50–74, Inderscience.
18. Chatterjee, D., Mondal,B. and **Halder, P.** (2014); "Hydromagnetic Mixed Convective Transport in a Vertical Lid-Driven Cavity including a Heat Conducting Rotating Circular Cylinder", Numerical Heat Transfer Part A, 65: 48–65.
19. Chatterjee, D., **Halder, P.** (2014), "MHD Mixed Convective Transport in a Square Enclosure with Two Rotating Circular Cylinders", Dipankar Chatterjee, **Pabitra Halder**; Numerical Heat Transfer Part A, 65: 802–824.
20. **Manna, M. C.**, (2014), Free vibration analysis of rectangular plates using a new triangular shear flexible finite element, International Journal of Emerging Engineering Research and Technology, 2(5), 89 – 98.

#### **Conference Publications :**

1. Roy S., Biswas J., Panda D., Deb A., **Bhowmik S., Khutia N., Roy Chowdhury A.**, (2012) "*Finite element study on crack development of titanium alloy (Ti6Al4V) specimen*", Indian Conference on Applied Mechanics, INCAM-2013, 4th -6th July, IIT Madras.
2. **Khutia N.**, Dey P. P., (2013) "*Optimization of input material parameters for Ohno-Wang hardening model using Genetic Algorithm*", Proc. of Int. Conference on Computer Aided Engineering (CAE-2013), pp 574-579, IIT Chennai, 19-21 December 2013.
3. Das P., **Khutia N.**, Dey P.P., (2013) "*Sensitivity analysis of Chaboche parameter for characterization of cyclic plasticity behaviour*", Proc. of Int. Conference on Computer Aided Engineering (CAE-2013), pp 465-470, IIT Chennai, 19-21 December 2013.
4. Singh R. B., **Khutia N.**, Sivaprasad S., Dey P.P., (2013) "*Application of genetic algorithm in the calibration of Ohno Wang kinematic hardening model for SA333 C-Mn Steel*", Proc. of 58th Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM 2013), BESU, Shibpur, 18-21 December 2013.
5. Roy S., Panda D., Deb A., **Bhowmick S., Khutia N., Roy Chowdhury A.**, (2013)



*“Finite element analysis of porous Ti-6Al-4V rectangular parallelepiped models under flexure”*, Proc. of 58th Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM 2013), BESU, Shibpur, 18-21 December 2013.

6. Basantia S., Roy S., **Khutia N., Roy Chowdhury A.**, (2013) *“Development of new element for finite element analysis of composite plates”*, Proc. of 58th Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM 2013), BESU, Shibpur, 18-21 December 2013.

7. S. Paul, K. Kalita, A Dutta and **S. Haldar** “Static analysis of rectangular plate with internal cut-out using finite element method”, IIT, Chennai, 2013 (INCAM\_2013\_SM\_98)

8. Kanak Kalita, Abir Dutta and **Salil Halder** “Stress concentration factor convergence study of a thin plate”, 58<sup>th</sup> Congress of ISTAM, Bengal Engineering and Science University, Shibpur, December 18 – 21, 2013.

9. Arpita Mandal and **Salil Haldar** “Free vibration analysis of shell panels by finite element method”, 58<sup>th</sup> Congress of ISTAM, Bengal Engineering and Science University, Shibpur, December 18 – 21, 2013.

10. **Roy, R.**, Ghosh, D. and Bhattacharya, G. (2013), “Estimating instability of slopes during earthquake: A simple framework”, Proc. of Indian Geotechnical Conference, Indian Institute of Technology, Roorkee, India, Dec. 22-24.

11. Thakur, P. and **Roy, R.** (2013), “Seismic Behaviour of Plan-asymmetric Structures under Spectrally Matched Records”, International Conference on Structural Engineering and Mechanics (ICSEM), Dec. 20-22.

12. Sengupta, A. and **Roy, R.** (2013), “Seismic Behaviour of R/C Frames with Bi-axial Interaction”, International Conference on Structural Engineering and Mechanics (ICSEM), Dec. 20-22.

13. Sengupta, A. and **Roy, R.** (2013), “Seismic Behaviour of R/C Bridge Pier with Bi-axial Interaction”, International Symposium on Theoretical and Applied Mechanics (ISTAM), Dec. 18-21.

14. Bhaumik, S. and **Das, P. K.** (2013), “Response of Idealized R/C Asymmetric Structural Systems under Near-fault Ground Motion,” Paper no.: 58-istam-sm-fp-43, 58TH Congress of The Indian Society of Theoretical and Applied Mechanics (ISTAM), An International Meet, December 18-21, Bengal Engineering and Science University, Shibpur, West-Bengal, India.

15. Sahoo, A., **Majumder, S., Roychowdhury, A.**, 2013. Dynamic response of knee-high-hip complex in seated posture during frontal impact. 58<sup>th</sup> Congress of Indian Society of Theoretical and Applied Mechanics (an International Conference), 18–21 December 2013, Bengal Engineering and Science University, Shibpur, Howrah, pp11.

16. Chatterjee, S., **Majumder, S.**, Mondal, P., Patwari, M., Saha, B., Bhattacharyya, B., **Roychowdhury, A.**, 2013. Effective stiffness of customized hip implants: Incorporation of cavity. 58<sup>th</sup> Congress of Indian Society of Theoretical and Applied Mechanics (an International Conference), 18–21 December 2013, Bengal Engineering and Science University, Shibpur, Howrah, pp9.

17. Pradhan, R., **Roychowdhury, A., Majumder, S.**, 2014. Finite element analysis of segmental cervical spine facet strain and disc stress after total disc replacement. National Conference of Biomechanical Sciences, 7–8 March, 2014, Siksha ‘O’ Anusandhan University, Bhubaneswar, pp22.

18. Chatterjee, S., Banerjee, S., **Majumder, S., Roychowdhury, A.**, 2014. Hip implantation: Modelling and analysis. National Conference of Biomechanical Sciences, 7–8 March, 2014, Siksha ‘O’ Anusandhan University, Bhubaneswar, pp12.
19. Roy S., **Khutia N.**, Das D., **Roy Chowdhury A.**, “Deformation Behavior of Solid and Porous Ti6Al4V Alloy under Static Loading Condition using FE Analysis”, “Microstructure and Materials “ March 12-13th , 2014, held at Bengal Engineering and Science University, Shibpur, Howrah, West Bengal.
20. Singh R. B., **Khutia N.**, Dey P.P., Sivaprasad S., 2014. *Evaluation of uniaxial and multiaxial fatigue of carbon steel through experiment and simulation using advanced kinematic hardening models*, Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2014), Nara, Japan from 10 to 13 October, 2014.
21. **Khutia N.**, Dey P.P., Sivaprasad S., 2014. *Modification of Ohno Wang cyclic plasticity model through simulation and experimentation of 304LN stainless steel specimen*, Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2014), Nara, Japan from 10 to 13 October, 2014.
22. Roy S., **Khutia N.**, Das D., **Roy Chowdhury A.**, 2014. FE analysis and deformation behavior of laser based porous Ti6Al4V using static loading condition, Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2014), Nara, Japan from 10 to 13 October, 2014.
23. Banerjee, A. K., Pramanik, D and **Roy, R.** (2014). " Investigating seismic demand due to bi-directional shaking per IDA based fragility curve". International Conference on Computational Mechanics and Simulation (ICCMS), 10-13th December, CSIR-SERC, Chennai.



# ***Department of Civil Engineering***



## About the Department

The University started its journey with the Department of Civil Engineering in 1856. Civil Engineering College, as the University was known at that time, began with ten students and two teachers in Civil Engineering with the objective of producing finest Civil Engineers in the country. Now, more than 157 years' old, Department of Civil Engineering remains the premier department of this University. During these years, the department has produced Civil Engineers who contributed immensely in shaping the pre- and post-independence India. Feeling the need of research and development, it started Master of Engineering in Civil Engineering programme in 1954. Currently it offers Master of Engineering and PhD programmes in five specializations: Environmental Engineering, Geotechnical Engineering, Structural Engineering, Highway and Traffic Engineering and Water Resources Engineering. Apart from teaching and research it is also actively engaged sponsored projects and industrial consultancy at national and international levels. At the societal level, the department has developed and successfully implemented technology solutions that helped thousands of rural people in getting pollution free water and thus living safely.

## Academic Programmes

### Undergraduate Level

- i. Degree offered: B.E.
- ii. Students' intake: 100
- iii. Additional intake through lateral entry in 3<sup>rd</sup> Semester : 10

### Postgraduate Level (Regular)

- i. Degree offered: M.E.
- ii. Students' intake: 38 (GATE)
- iii. Additional intake through other programmes: Nil
- iv. Specializations: Environmental Engineering, Geotechnical Engineering, Highway and Traffic Engineering, Structural Engineering and Water Resources Engineering

### Postgraduate Level (Part time)

- i. Degrees offered: M.E. in Environmental Engineering,  
M.E. in Geotechnical Engineering  
M.E. in Structural Engineering,  
M.E. in Transportation Engineering,  
M.E. in Water Resources Engineering
- ii. Students' intake: 39

### Doctoral & Postdoctoral Research Programme

- i. Degree offered: Ph.D.
- ii. No. of candidates: Enrolled: 14; Registered: 04, Submitted: 01, Awarded: 01

**Faculty position**

Sanctioned: 34

Vacant: 06

**Faculty profile (in the following table)**

| SL No. | Name                       | Designation                  | Highest Qualification | Specialisation/ Research Area       | Contact No. E-mail    |
|--------|----------------------------|------------------------------|-----------------------|-------------------------------------|-----------------------|
| 01     | Saibal Kumar Ghosh         | Bijoy – Ashu Chair Professor | Ph.D.                 | Structural Engg., Conc. Tech.       | 2668-4561 (Extn. 659) |
| 02     | Gautam Bhattacharya        | Professor                    | Ph.D.                 | Geotech. & Highway Engg.            | 2668-4561 (Extn. 281) |
| 03     | Kalyan Kumar Chattopadhyay | Professor                    | Ph.D.                 | Geotech. & Structural Engg.         | 2668-4561 (Extn. 660) |
| 04     | AjitLalGuha                | Professor                    | Ph.D.                 | Structural Engg. & Mgmt.            | 2668-4561 (Extn. 678) |
| 05     | Kalyan Kumar Bhar          | Professor& Head              | Ph.D.                 | Water Resources Engg.               | 2668-4561 (Extn. 674) |
| 06     | Subrata Chakraborty        | Professor                    | Ph.D.                 | Structural Engg., Conc. Tech.       | 2668-4561 (Extn. 673) |
| 07     | Anirban Gupta              | Professor                    | Ph.D.                 | Environmental Engg.                 | 2668-4561 (Extn. 675) |
| 08     | Sudip Kumar Roy            | Professor                    | Ph.D.                 | Transportation Engg.                | 2668-4561 (Extn. 666) |
| 09     | Ambarish Ghosh             | Professor                    | Ph.D.                 | Geotechnical Engg.                  | 2668-4561 (Extn. 653) |
| 10     | Sugato Pal                 | Associate Professor          | M.E.                  | Structural Engg.                    | 2668-4561 (Extn. 714) |
| 11     | DebashisMoitra             | Associate Professor          | M.E.                  | Geotechnical Engg.                  | 2668-4561 (Extn. 711) |
| 12     | Chaitali Ray               | Associate Professor          | Ph.D                  | Structural Engg.                    | 2668-4561 (Extn. 661) |
| 13     | PratipBandyopadhyay        | Associate Professor          | M.E.                  | Environmental Engg.                 | 2668-4561 (Extn. 657) |
| 14     | Arun Kumar Chakraborty     | Associate Professor          | MTRP                  | Structural Engg., Conc. Tech.       | 2668-4561 (Extn. 645) |
| 15     | Aparna (Dey) Ghosh         | Associate Professor          | Ph.D.                 | Structural Engg.                    | 2668-4561 (Extn. 663) |
| 16     | Pranab Kumar Lai           | Associate Professor          | M.E.                  | Water Resources Engg.               | 2668-4561 (Extn. 667) |
| 17     | DebabrataMazumber          | Associate Professor          | Ph.D.                 | Environmental Engg.                 | 2668-4561 (Extn. 654) |
| 18     | Prasanta Chakraborty       | Asst. Professor              | M.E.                  | Structural Engg.                    | 2668-4561 (Extn. 715) |
| 19     | Ashis Kumar Bera           | Asst. Professor              | Ph.D.                 | Geotechnical Engg.                  | 2668-4561 (Extn. 655) |
| 20     | Sujata Biswas              | Asst. Professor              | Ph.D.                 | Water Resources Engg.               | 2668-4561 (Extn. 672) |
| 21     | Tapash Kumar Roy           | Asst. Professor              | Ph.D.                 | Geotechnical & Transportation Engg. | 2668-4561 (Extn. 668) |
| 22     | ChanchalMajumder           | Asst. Professor              | Ph.D.                 | Environmental Engg.                 | 2668-4561 (Extn. 661) |
| 23     | SoumyaBhattacharjya        | Asst. Professor              | Ph.D.                 | Structural Engg.                    | 2668-4561 (Extn. 715) |
| 24     | Sandip Chakraborty         | Asst. Professor              | M.E.                  | Transportation Engg.                | 2668-4561 (Extn. 672) |
| 25     | Asok Adak                  | Asst. Professor              | Ph.D.                 | Environmental Engg.                 | 2668-4561 (Extn. 658) |
| 26     | Sujit Kumar Dalui          | Asst. Professor              | Ph.D.                 | Structural Engg.                    | 2668-4561 (Extn. 822) |
| 27     | SnehaMurmu                 | Asst. Professor              | M.E.                  | Water Resources Engg.               |                       |
| 28     | UjjalSaha                  | Asst. Professor              | M.E.                  | Water Resources Engg.               |                       |
| 29     | PritamSaha                 | Asst. Professor              | Ph. D.                | Transportation Engg.                |                       |

## **Awards and laurels**

- DrAsok Adak has been awarded ShrimatiSaromaSanyal Memorial Prize by the Institute of Engineers (India)
- DrAsok Adak has been awarded Raman Fellowship sponsored by UGC for Post-Doctoral Research in USA for a period of one year.
- Prof. DebabrataMazumder awarded the best and novel paper presenter on the paper titled” Process Design of Aerobic Hybrid Bioreactor for the Treatment of Municipal Waste Water” in Intellectual Property Right Congress organized by Patent Facilitating Centre (GOI) and Patent Information Centre (GoWB) Sept.’2013.

**Research area** (only mention broad titles without description in detail)

### **Environmental Engineering**

- Development of Domestic and Community-based Arsenic Removal Units and Installation at Arsenic-contaminated areas
- Testing and standardizing a low-cost domestic water filter for iron and arsenic removal
- Screening of public water sources for arsenic contamination
- Rapid assessment for fluoride contamination in West Bengal
- Development of new materials for arsenic removal
- Water treatment for surface water at village-level
- Technology for treatment of septic tank effluent
- Characterization of and energy recovery from municipal solid waste

### **Geotechnical Engineering**

- Application of stone columns as cost effective foundation system in soft soil
- Application of Jute Geotextiles in Civil Engineering
- Application of Geotube in Civil Engineering Construction
- Reliability in Geotechnical Engineering
- Analysis & Design of waste containment liner design for containment transport modeling
- Risk evaluation of pile foundation in liquefiable soil
- Study on liquefaction of soil for mutation and of mitigation strategy with special emphasis to microzonation of Kolkata
- Use of waste materials for Road Construction
- Behaviour of piles under complex loading

### **Structural Engineering**

- Fibre Reinforced Composite Structures
- Concrete Technology (High performance concrete, Lightweight concrete, Geopolymer concrete, High-volume fly ash concrete, Self compacting concrete etc.)
- Reliability Analysis of Structures
- Structural Dynamics and Earthquake Engineering
- Computational Mechanics (FEM, BEM, SFEM)
- Structural Health Monitoring
- Corrosion of steel in concrete
- Vibration control



## **Transportation Engineering**

- Highway Capacity and Level of Service
- Traffic Congestion Analysis
- Alternate Pavement Material
- Public Transport System Planning
- Road Safety
- Design and Management of Rural Roads
- Rigid Pavement Design
- Pavement Distresses and Maintenance Management

## **Water Resources Engineering**

- Water Resources Planning and Management
- Flood Hazard Mitigation
- Reservoir operation
- Stochastic Hydrology
- Storm Water Management
- River Hydraulics and Modeling
- Watershed Management
- Remote Sensing and GIS Applications
- ANN Applications in Water Resources Systems

**Research Facilities:** (Major equipment / picture etc.)

**Environmental Engineering**

- Atomic Absorption Spectrometer
- Gas Chromatography



Atomic Absorption Spectrometer

**Geotechnical Engineering**

- Pile Integrity Testing Setup
- Digital Triaxial Testing Setup
- Seismic Down Hole Testing System



Digital Triaxial Testing Setup

**Structural Engineering**

- Modal Testing Set-up
- Automatic Compression Testing Machine
- Corrosion Analysis Instrument
- NDT Facilities
- Composite Testing Lab
- Vibration Testing Facilities
- 100kN UTM



Automatic Compression Testing Machine

**Transportation Engineering**

- Field Asphalt Content Tester
- Hand-held Falling Weight Deflectometer
- V Box
- Digital Camera for traffic survey
- Laser Distometer



Field Asphalt Content Tester

**Water Resources Engineering**

- Remote Sensing and GIS Setup
- High-performance Computing



Remote Sensing and GIS Setup

| Some Recently Created Facilities   |   |   |
|--|---|---|
|   |   |  |
| Composite testing facilities   |   | 100kN UTM   |
|   |    |  |
| Vibration Control Testing Facilities   | CAPO Test System  | Hand Held Core Cutter   |
|  |  |   |
| GPR for concrete testing   | SASW test set up  |   |

### Laboratories

| Name of the Laboratory              | Purpose   |
|-------------------------------------|---|
| 1. Computer Lab                     | <ul style="list-style-type: none"> <li>To conduct regular laboratory classes according to undergraduate and postgraduate curricula</li> <li>To provide testing facilities to outside agencies.</li> <li>To undertake research work</li> </ul> |
| 2. Concrete Technology Lab          |   |
| 3. Environmental Engineering Lab    |   |
| 4. GIS Lab                          |   |
| 5. Geotechnical Engineering Lab     |   |
| 6. Geotextile Engineering Lab       |   |
| 7. Model Analysis Lab               |   |
| 8. Structural Engineering Lab       |   |
| 9. Structural Dynamics Lab          |   |
| 10. Surveying Lab                   |   |
| 11. Transportation Engineering Lab  |   |
| 12. Water Resources Engineering Lab |   |

### Consultancy work:

| Title   | Principal Investigator  | Funding Agency                        | Amount (Rs. In Lakhs) |
|---|---|---------------------------------------|-----------------------|
| Proof Checking of Detailed Design and Drawing of the Foundation of Railway Bridges: in connection with gauge conversion work of SakriNirmali&Jhanjharpur - Laukaha Bazar Section  | Asok Adak   | East Central Railway                  | 3.26                  |
| Third Party Consultant for '1829 mm (OD) MS transmission pipe line from intake works atRani DebendrabalaGhat on River Hooghly to Water treatment Plant at New Town in Action Area-1A for 100 MGD Transmission Capacity  | Saibal Ghosh, K KChattopadhyay, Subrata Chakraborty             | PHED, Govt of WB                      | 416                   |
| Analysis of Glass Fibre   | Ashis Kumar Bera  | Sardip Consulting Engineers           | 0.3                   |
| Analysis of Bottom Ash and Steel Plant Slag Material in Ash Dyke as substitute of Sand  | Ashis Kumar Bera  | NTPC-SAIL                             | 1.2                   |
| Hydrogeological study of sub-surface water flow/storage characteristics for creation of sustainable source on rain fed river for semi-arid and fluoride affected six blocks in connection with comprehensive water security plan for Damodar&Kangsabati River under Bankura district. | Kalyan Kumar Bhar ChanchalMajumdar Ambarish Ghosh Sujata Biswas | PHED (West Bengal)                    | 62.7                  |
| Traffic Study for proposed elevated connector between Belghoria Expressway and Kalyani Expressway   | Sudip K Roy Sandip Chakraborty                                  | P. W. (Roads) Directorate             | 2.60                  |
| Preparation of DPR for JNNURM Funding   | Sudip K Roy Tapas Kumar Roy Sandip Chakraborty                  | Howrah Improvement Trust              | 12                    |
| Consultancy Service in the form of Advice and Guidance for Pavement Design of Runway, Taxiway and Apron of Kannur International Airport, Kannur   | Sudip K Roy Sandip Chakraborty                                  | ITD Cementation India Limited         | 4                     |
| Consultancy Service Preparation DPR of Salkia Flyover Project   | Sudip K Roy Sandip Chakraborty                                  | Howrah Improvement Trust              | 3                     |
|   |   |                                       |                       |
| Investigation Regarding Pavement Deterioration In The Kholapopota-Baduria- Maslandapur- Habra Road  | Sudip K Roy Tapas Kumar Roy                                     | MAXDWELL Enterprise                   | 0.3                   |
| Vetting of pavement design of strengthening and widening to Barjora to Mejhia (Durlavpur More) Road   | Sudip K Roy Tapas Kumar Roy Sandip Chakraborty                  | M/S Caritas Infra Consulting Pvt. Ltd | 0.75                  |
| Pavement Construction Quality Investigation for road at IQ City, Durgapur   | Sudip K Roy Ambarish Ghosh                                      | SPS Mani Infrastructure Pvt. Ltd.     | 2.58                  |

#### Support staff position:

Sanctioned technical post: 13

Technical staff profile (in the following table)

| Name                         | Designation           | Highest Qualification | Contact No./ E-mail |
|------------------------------|-----------------------|-----------------------|---------------------|
| Shri TinkariPatra            | Superintendent (Tech) | B.Sc. DCE             | 2668-4561(Extn.769) |
| Shri Dipak Kumar Roy         | Superintendent (Tech) | B.Sc. DCE             | 2668-4561(Extn.283) |
| Shri Ranjan Kumar Biswas     | Superintendent (Tech) | B.Sc. DCE             | 2668-4561(Extn.283) |
| Shri Swapan Kumar Roy        | Lab. Asst.            | B.Sc.                 | 2668-4561(Extn.254) |
| Shri Indranath Chakraborty   | Jr. Superintendent    | DCE                   | 2668-4561(Extn.665) |
| Shri Sajal Kumar Chakraborty | Tech. Asst. I         | B.Sc. (Hons.)         | 2668-4561(Extn.283) |
| Mrs. AmritaBandyopadhyay     | Tech. Asst. I         | B.Sc. (Hons.), MCA    | 2668-4561(Extn.677) |
| Shri Amar Tarafder           | Tech. Asst. II        | DCE                   | 2668-4561(Extn.282) |
| Shri Mohini MohanDebsharma   | Tech. Asst. II        | DCE                   | 2668-4561(Extn.282) |
| Md. ShafiulAlam (in Lien)    | Tech. Asst. II        | B.E. (C.E.)           | 2668-4561(Extn.761) |
| Shri SwarupShovan Mukherjee  | Tech. Asst. II        | DCE                   | 2668-4561(Extn.282) |

**Sponsored Research (Ongoing):**

| <b>Title</b>  | <b>Principal Investigator</b>  | <b>Funding Agency</b>                               | <b>Amount<br/>(Rs. In Lakhs)</b> |
|---|--|---|----------------------------------|
| <b><i>International</i></b>   |  |   |                                  |
| Assessment of effects of arsenic pollution on health in rural Bengal and development and implementation of sustainable technology solution.             | Kalyan Kumar Bhar<br>ChanchalMajumdar  | UKIERI(UK-India Education and Reasearch Initiative) | £ 40000                          |
| Provision of safe water and appropriate sanitation in schools   | Anirban Gupta  | Water For People                                    | US\$106374.44                    |
| Safe Water and Sanitation in Schools, Communities and Clinics.  | Anirban Gupta  | Water For People, USA                               | US\$ 43693                       |
| Development and Application of Potentially Important Jute Geo-Textiles  | Ambarish Ghosh,<br>Sudip Kumar Roy<br>Asish Kumar Bera<br>Sandip Chakraborty | CFC, The Netherlands                                | Rs. 40 Lakhs                     |
| <b><i>National</i></b>  |  |   |                                  |
| Development of Indian Highway Capacity Manual (Indo-HCM)  | Sudip Kumar Roy<br>Sandip Chakraborty<br>Tapas Kumar Roy                     | CSIR-CRRI   | Rs. 100.45 Lakhs                 |
|   |  |   |                                  |
| Identification of Spatial Dispersion Pattern of Dredge Materials in a Coastal River Reach from Radioactive Tracer Experiments and Hydrodynamic Modeling | Kalyan Kumar Bhar  | BRNS  | Rs. 35lakhs                      |
| Static and Dynamic failure analysis of laminated composite stiffened plates for marine structures   | Chaitali Roy   | Ministry of shipping                                | Rs. 39.53 Lakhs                  |
| Geometric nonlinear thermo-mechanical analysis of FRP bridge deck   | Chaitali Roy   | DST, New Delhi                                      | Rs. 18.0 Lakhs                   |
|   |  |   |                                  |
| Passive control of seismically excited short period structures by the compliant liquid column damper  | Aparna (Dey) Ghosh   | DST   | Rs. 36 Lacs                      |
| Rural road pavement performance study   | Sudip Kumar Roy  | NRRDA, Govt. of India                               | Rs. 4.0 Lakhs                    |
| Technology Development of high performance fibre reinforced concrete composites for different applications  | Arun Kumar Chakraborty   | Tata Steel  | Rs. 17.5 Lakhs                   |
| Details study on performance of concrete mixes made with ACC cement visa-vice than other cement Brand   | Arun Kumar Chakraborty   | ACC Cement  | Rs. 2.25 Lakhs                   |
| Performance evaluation of river Brahmaputra bed materials for use in construction of road embankment, subgrade and subbase                              | Ambarish Ghosh   | DST   | Rs. 39.554 Lakhs                 |
| Water, sanitation and hygiene education programme in school.  | Water for people, USA  | 2013-14   | Rs. 18.8 Lakhs                   |
| Seismic Hazard Assessment, Microzonation and Evaluation of Vulnerability, Risk and Socio Economic Impacts for the City of Kolkata                       | Ambarish Ghosh   | Ministry of Earth Science, GOI                      | Rs. 8.0 Lakhs                    |
| Utilization of alternative materials for construction of subgarde and sub base layer of flexible pavements  | Tapas Kumar Roy<br>Sudip Kumar Roy   | UGC   | Rs. 7.0 Lakhs                    |
| Wind effects on Irregular Plan Shape Tall Buildings   | Sujit Kumar Dalui  | DST, GOI  | Rs. 3.6 Lakhs                    |
| Seismic Vulnerability Assessment of Existing Building to Supplement Rehabilitation practices with special emphasis to North Eastern Region              | Subrata Chakraborty  | DST, GOI  | 61 Lakhs                         |

## **Industry Institution Interaction**

### **Refresher Courses**

MoU between Central Road Research Institute and Bengal Engineering and Science University, Shibpur in December 2013 for interaction in studies and research in various transportation infrastructure issues.

Organized 1-week Training Program for "ISGP Personnel" under Panchayat and Rural Development Department, Government of West Bengal during March 03 - 07, 2014. DBM.

### **Visits**

#### **i) Departmental Faculty Members**

Prof Tapask Kumar Roy Visited Japan in 2013 for attending the Asian Conference on Civil, Material and Environmental Sciences (ACCMES 2013).

Prof AparnaDey Ghosh visited Trinity College, Dublin, Ireland, July 8-10, 2013 to participate in the 10th International Conference on Damage Assessment of Structures (DAMAS -2013) held at.

Prof. Kalyan Kumar Bhar and Prof. ChanchalMajumder visited Queen's University, Belfast, UK, during June July 2013 for two weeks in UK-India Education and Research Initiative on Assessment of effects of arsenic pollution on health in rural Bengal and development and implementation of sustainable technology solution.

#### **ii) External Visitors**

##### **Invited Lectures**

Prof AparnaDey Ghosh delivered invited lecture at the SYSWIND Workshop held during the 10th International Conference on Damage Assessment of Structures (DAMAS -2013) held at Trinity College, Dublin, Ireland, July 8-10, 2013.

Prof. Subrata Chakraborty delivered Dr K L Rao Memorial Lecture on "Seismic Vulnerability Assessment of Existing Buildings - Developments and Challenges", at 29th National Convention of Civil Engineers, 11th Nov. 2013, Shillong, Meghalaya.

Prof. Chaitali Ray (2013). "Composite materials in sustainable development" Institute of Engineering and Technology, Conference held on December 2013, Kolkata.

Prof. Subrata Chakraborty delivered a Keynote Lecture on "Optimum design of liquid column dampers under uncertainty" and chaired a session in the International Conference on Structural Engineering and Mechanics (ICSEM 2013), 20th -22nd December 2013 at NIT Roukela, Odisha.

Prof. Subrata Chakraborty delivered invited Lecture on (i) Nonlinear Random Vibration: Statistical Linearization Application to some passive vibration control problem and SMA based Passive control System, workshop on "Nonlinearities in Structural Engineering and Mechanics: Concepts, Recent Developments and Applications during February 21, 2014, NIT Durgapur

### **No. of publications:**

Journal Publication: 37

Conference Publication: 31

### **List of Publications**

#### **Journals**

1. Metya, S. and Bhattacharya, G. (2014), "Probabilistic Critical Slip Surface for Earth Slopes Based on the First Order Reliability Method", Indian Geotechnical Journal, Springer, Volume 44, Issue 3, pp 329-340.
2. Konar, T. and Ghosh (Dey), A. (2013) "Bimodal vibration control of seismically excited structures by the liquid column vibration absorber." *Journal of Vibration and Control (SAGE)*, 19(3), 385-394.
3. Mondal, D. P., Ghosh (Dey), A. and Chakrabarty, S. (2014) "Control of underground blast induced vibration of structures using fluid viscous damper" *Journal of Vibration Engineering and Technologies*, 2(1), 27-33.
4. Mondal, D. P., Ghosh (Dey), A. and Chakrabarty, S. (2014) "Performance of N-Z system in mitigation of underground blast induced vibration of structures." *Journal of Vibration and Control (SAGE)*, 20 (13), 2019-2031.
5. Tanmoy Chatterjee and Subrata Chakraborty, Vibration Mitigation of Structures Subjected to Random Wave Forces by Liquid Column Dampers, *Ocean Engineering* 87, 2014, 151-161.

6. Sudib K Mishra, S Gur and Subrata Chakraborty, Stochastic Optimization of Shape-Memory-Alloy-Rubber-Bearing (SMARB) for Isolating Buildings against Random Earthquake, *Structural Control & Health Monitoring* 2014, 21(9), 1222-1239, DOI: 10.1002/stc.1635
7. Sourva Gur, S K Mishra and S Chakraborty, Performance assessment of buildings isolated by Shape Memory Alloy Rubber Bearing (SMARB) under near-fault earthquakes: comparison with conventional Elastomeric Bearing, *Structural Control & Health Monitoring*, 21(4), 2014, 449-465 DOI: 10.1002/stc.1576.
8. Bijan K Roy, Subrata Chakraborty and Sudib Kumar Misra, Robust optimum design of base isolation system in seismic vibration control of structures under uncertain bounded system parameters, *J. of Vibration and Control.*, 20(5), 2014, 786-800, doi:10.1177/1077546312466577.
9. Subrata Chakraborty, Arunabh Sen, Adaptive response surface based efficient Finite Element Model Updating, *Finite Elements in Analysis and Design*, 80, 2014, 33–40
10. Sudib Kumar Mishra, Bijan K Roy and Subrata Charaborty, Reliability based optimization of base isolated building under stochastic earthquake load considering random system parameters. *Int J of Mechanical Science, Elsevier Sc.* Vol 75, 2013, 123–133 1.540
11. Sudib K Mishra, S Gur and Subrata Chakraborty, An improved tuned mass damper (SMA-TMD) assisted by a shape memory alloy spring, *Smart Materials and Structures* 22(9) 2013, doi:10.1088/0964-1726/22/9/095016
12. Sudib K. Mishra, Subrata Chakraborty, Stochastic optimization of Isolator for base isolated building under parametric uncertainty subjected to random earthquakes, *Int. J. of Acoustic and Vibration*. 18 (1), 7-19, 2013
13. Subrata Chakraborty and Palash C Sam, Safety Assessment of Hybrid Uncertain System: An Overview, *Int J. of Life Cycle Reliability and Safety Engineering*, 2(1), 2013, 23-34
14. Bijan K Roy and Subrata Chakraborty, Optimal design of Base Isolation System considering uncertain bounded system parameters, *Struct. Engg Mechanics*, 46(1) (2013) 19-37.
15. Palash Chandra Sam and Subrata Chakraborty, Possibilistic safety assessment of hybrid uncertain systems, *Int. J. of Reliability, Quality and Safety Engineering*. 20(1), 2013, 1350002-1-19, DOI: 10.1142/S0218539313500022.
16. Chakraborty, S., Dalui, S. K., and Ahuja, A.K., Wind Load on Irregular Plan Shape Tall Building -A Case Study, *Wind and Structures, An Int J*, 19(1)014, 59-73.
17. Chakraborty, S., Dalui, S. K., and Ahuja, A.K., Experimental Investigation of Surface Pressure on ‘+’ Plan Shape Tall Building, *Jordan Journal of Civil Engineering*, Vol. 8, No.3, 2014, 251-262.
18. Dalui, S. K., Experimental Investigation of Wind Pressures on Composite Plan Shape Tall Building, *International Journal of Construction Materials and Structures*, Vol. 2, No.-1, 2014, 36-53
19. Chakraborty, S., Dalui, S. K., and Ahuja, A.K., Experimental and Numerical Study of Surface Pressure on ‘+’ Plan Shape Tall Building, *Int J of Construction Materials & Struct*, 1(1), 45-58, 2013.
20. Bhattacharyya, B., Dalui, S. K., and Ahuja, A.K., Wind induced pressure on ‘E’ plan shape tall building, *Jordan Jl of Civil Engineering*, Vol. 8, No.2, 12-134.
21. Ghosh, D., Sarkar, S., Sengupta, A. K., and Gupta, A. (2014) Investigation on the long-term storage and fate of arsenic obtained as a treatment residual: A case study. *J of Hazardous Material* 271 : 302-310.
22. Koner, S., Pal, A. and Adak, A., “Application of silica gel factory waste for methyl orange dye removal”, *Int. J. Environ. Waste Mgmt.*, Vol. 13, No. 1, 2014, pp. 37-49.
23. Koner, S., Pal, A. and Adak, A., “Adsorption of 2,4-D Herbicide from Water Environment on Modified Silica Gel Waste”, *Water Environment Research*, Vol. 85, No. 11, 2013, pp. 2147-2156.
24. Koner, S. and Adak, A., “Fixed Bed Column Study for Adsolubilization of 2, 4-D Herbicide on Surfactant Modified Silica Gel Waste”, *J of The Institution of Engineers (India): Series A*, 93(3), 2013, 187-191.
25. Misra, K. C., Panda, D. ,Bhattacharjya, S. (2014) “Fatigue life assessment of century old railway bridge in India”, *Int. J of Innovative Research in Science, Engg and Tech*, 3(3), 10803-10808.
26. Saha, P., Bhadra, A., Reddy, N. S. & Sarkar, A. K. (2013). Method of identifying low performance vehicles in heterogeneous traffic on two-lane highways. *Procedia - Social and Behavioral Sciences, Elsevier*, 104, 526-532.
27. Saha, P., Sarkar, A. K. & Pal, M. (2013). Field evaluation of percent time spent following on two-lane highways under mixed traffic situation. *Int J of Civil Engn& Building Materials*, 3(4), 192-198.
28. Ashis Kumar Bera (2014) Compaction characteristics of fine grained soil and rice husk ash mixture, *International Journal of Geotechnical Engineering*. Vol.8, Issue 2, Pp.121-129.



29. Ashis Kumar Bera (2014). Parametric study on uplift capacity of anchor with tie in sand, *KSCE Journal of Civil Engineering*, Vol.18 No. 5.
30. Ashis Kumar Bera (2013) Effect of Jute Geotextile on Consolidation Parameters for Fine Grained Soils and their Mathematical Model., *Electronic J of Geotechnical Engineering*, (ISSN: 1089- 3032), USA, Vol. 17, Bundle L, pp. 2489-2500.
31. Ashis Kumar Bera (2013) Study on unconfined compressive strength of pond ash soil mixture reinforced with jute geotextiles, *Emirates Journal for Engineering Research*, 18 (1), 59-65
32. Ashis Kumar Bera and Uday Banerjee (2013) Uplift capacity of model belled anchor embedded in sand, *International Journal of Geotechnical Engineering*. Vol.7, Issue 1, Pp.84-90
33. Palchaudhuri, M. and Biswas, S.(2013), "Analysis of Meteorological Drought using SPI- a case study of Puruliya district, West Bengal, India", *International Journal of Environmental, Ecological, Geological and Mining Engineering*, Vol 7, No. 3, pp 119 -126.
34. Sarkar, S. and Biswas, S. "Selection of Suitable Sites for Water Harvesting Structures in a Catchment using Remote Sensing and GIS", *Int J of Earth Sciences and Engineering*, 7(1),175-180.
35. Roy, T.K. (2013) "Evaluation of properties of alluvial soil with addition of wastes from thermal power plant and rice mill" *International Journal of Geotechnical Engineering*, 7(3), 323-329.
36. Roy, T. K., Ghosal, R, (2013) 'A Study on Evaluation of Stress Behavior of Rigid Pavement by Concept Shell System', *Journal of Indian Highway*, July, pp21-24.
37. Chakraborty, R and Ghosh, A (2013). Three-Dimensional Analysis of Contaminate Migration through saturated Homogeneous Soil Media using FDM, *ASCE, Intl J of Geomechanics*, 13(6), 699-712.

#### **Conferences**

1. Metya, S. and Bhattacharya, G. (2013), "Reliability Evaluation of Earth Slopes Using FORM", *Proceedings of Indian Geotechnical Conference*, IIT, Roorkee, 10TH-05, 01-08.
2. Roy, R., Ghosh, B. and Bhattacharya, G. (2013) "Estimating Instability of slopes during earthquake: a simple framework" *Proceedings of Indian Geotechnical Conference*, IIT, Roorkee.
3. Roy, A. and Ghosh, A. (D.) (2013). "Tuned Liquid Damper System for Seismic Vibration Control of Elevated Water Tanks." *Proc. International Conference on Structural Engineering and Mechanics*, (ICSEM), NIT, Rourkela, India.
4. Bhattacharyya, S. and Ghosh, A. (D.) (2013). "Effect of Mass ratio on the Performance of a TMD with non-optimal damping." *Proc. International Conference on Structural Engineering and Mechanics*, (ICSEM), NIT, Rourkela, India.
5. Dutta Majumdar, J. and Ghosh, A. (D.)(2013). "Control of Wind-induced Vibration in Transmission Line Towers using Tuned Liquid Column Damper." *Proc. International Conference on Structural Engineering and Mechanics*, (ICSEM), NIT, Rourkela, India.
6. Ghosh, A. (D.), Bhattacharyya, S. and Roy, A. (2013). "On the seismic performance of elevated water tanks and their control using TLDs." *10<sup>th</sup> International Conference on Damage Assessment of Structures*, (DAMAS), Dublin, Ireland. Vol. 569-570 of *Key Engineering Materials*, pp 270-77.
7. Mondal, K.K. and Ghosh, A. (D). (2013). "Seismic vibration control of primary-secondary systems by the TLCD." *Proc. Vienna Congress on Recent Advances in Earthquake Engineering and Structural Dynamics (VEESD 2013)*, Vienna, Austria.
8. S Chakraborty and R Debbarma, Optimum design of liquid column dampers under uncertainty, *IntConf on StructEngg&Mech (ICSEM 2013)* 20<sup>th</sup> -22<sup>nd</sup> Dec. 2013 at NIT Rourkela, Odisha.
9. Subrata Chakraborty, Seismic vulnerability assessments of existing building -developments and challenges, *Dr. K.L. Rao Memorial Lecture*, Nov. 15<sup>th</sup>, 2013 at 29<sup>th</sup> National Convention of Civil Engineers, Shillong.
10. Shyamal Ghosh and Subrata Chakraborty, A comparative study on efficient fuzzy structural response analysis, *ISTAM 2013 BESU Shibpur*
11. Rama Debbarma, S Chakraborty , Robust optimum design of liquid column dampers in seismic vibration control, *Intconf on advance s in Civil, Struct, EnvEngg*, Oct 12-13, 2013 Zurich Switzerland
12. Bijan Kumar Roy and Subrata Chakraborty, Reliability based design of TMD system considering system parameter uncertainty in seismic vibration control, *Intconf on StructEngg and Mech (ICSEM-2013)*, Dec 20-22, NIT Rourkela.



13. SomdattaGoswami , Shymal Ghosh, Subrata Chakraborty, Adaptive Response Surface Method Based Efficient Monte Carlo Simulation, Intconf on StructEngg and Mech (ICSEM-2013, Dec 20-22, NIT Roukela.
14. Chakraborty, S. and Dalui, S. K., Numerical Study of Surface Pressure on Square Plan Shape Tall Building, Proc. of Symposium on Sustainable Infrastructure Development (SID), 8<sup>th</sup>-9<sup>th</sup> February 2013, IIT Bhubaneswar, India.
15. Mangalgiri, K., Adak, A. and Blaney, L. "UV-based processes for treatment of organoarsenicals in agricultural wastewater/runoff", Proceedings of Second International Workshop on Sustainability and Water Quality, Department of Chemistry, University of Delhi, Delhi – 110 007, January, 2014.
16. Bhattacharjya, S. and Saha, U. (2013) "Reliability Based Optimal Design of Steel Conveyer Gallery Structure considering Parameter Uncertainty in Latest IS: 800-2007 Framework", 58<sup>th</sup> Congress Of ISTAM-2013, December 2013, BESU, Shibpur, India.
17. Bhattacharjya, S., Saha, U., Modak, A. and Sarker, B.(2013) Probabilistic Assessment of Safety, Economy and Robustness of Steel Structure Including Parameter Uncertainty in IS: 800-2007 Format", IntConf on Structural Engg and Mechs, Dec 20-22, 2013, NIT Rourkela, Odisha, India.
18. Bhattacharjya, S., Chakraborti, S. (2014) "Probabilistic Robust Design Optimization of Reinforced Concrete Folded Plate Structures incorporating Parameter Uncertainty", National Conference on Emerging Technology and Applied Sciences (NCETAS 2014), February 15-16, 2014 Modern Institute Of Engineering & Technology, Hooghly, India
19. Misra, K. Ch., Panda D. and Bhattacharjya S. (2014) "Fatigue Life Assessment of Century Old Railway Bridge in India", National Conference on Emerging Technology and Applied Sciences (NCETAS 2014), February 15-16, 2014 Modern Institute Of Engineering & Technology, Hooghly, India
20. Bera, A.K. and Hazra, S . Effect of RHA content on engineering properties of clayey soil RHA mixture, IGC Calcutta ( Kolkata Chapter ), pp. 82-84., 2014.
21. Roy, S.K., Ghosh, A, Bera, A.K., and Chakraborty, S ( 2013 ) "Load settlement behaviour of Jute geotextile reinforced subgrade of rural road using ABAQUES" National Seminar on Jute Geotextiles, Calcutta.
22. S. Mondal, S, Patra, Bera, A.K., Effect of u / B ratio on bearing capacity of footing on reinforced sand: a FEM based analysis, IGC Roorkee, 2013.
23. Roy, T.K., (2013) " Evaluation of Strength of Clayey Soil by UCS Test with Addition of Rice husk ash and Lime" Proc of the Seventh Intl Conf on Case Histories in GeotechEngg, Chicago, USA.
24. Roy, T.K., (2013) "Effect of sand on strength characteristics of expansive soil for using as Subgrade of pavement" Proceedings of the International Conference on Engineering and Applied Science, Osaka, Japan.
25. Roy, T.K., (2013) "A study on strength characteristics of alluvial soil with addition of laterite and sand for using as roadway subgrade" Proceedings of the Asian Conference on Civil, Material and Environmental Sciences, Osaka, Japan.
26. Roy, T.K. (2013) "Influence of sand on strength characteristics of cohesive Soil for using as Subgrade of road" Proceeding on the National Seminar on 2<sup>nd</sup> Conference of Transportation Research Group of India (CTRG), Agra, India.
27. Kuity, A. and Roy, T.K.(2013) "Utilization of Geogrid mesh for improving the soft subgrade layer with waste material mix compositions" Proceeding on the National Seminar on 2<sup>nd</sup> Conference of Transportation Research Group of India (CTRG), Agra, India.
28. Chaitali Ray (2014). "Laminated Composites as Building Materials in Indian Scenario", Institute of Engineers Convention held on 30<sup>th</sup> -31<sup>st</sup> January, 2014 at the Institute of Engineers, Kolkata.
29. Moumita Sit, Chaitali Ray and Bibekananda Mandal (2013), "Hygrothermal analysis of FRP Bridge deck", Proc58<sup>th</sup> ISTAM Congress (An Int meet) at BESU, Shibpur, Dec 18 to 21, 2013.
30. Dhiraj Biswas and Chaitali Ray (2013). "Free vibration analysis of beams and plates- numerical and experimental investigations", Proc 58<sup>th</sup> ISTAM Congress (An Int meet) at BESU, Shibpur, Dec 18 to 21, 2013.
31. C. Ray and S. Majumder (2013). "Time history analysis of failure index of laminated composite plates under pulse loading". Proc. Indian Concrete Journal, 4<sup>th</sup> Intl workshop PROTECT 2013, Mysore, 26<sup>th</sup>-27<sup>th</sup> August, 2013.

### **Books and Book Chapters**

Chakraborty, Subrata; Bhattacharya, Gautam (Eds.), Proceedings of the International Symposium on Engineering under Uncertainty: Safety Assessment and Management

(ISEUSAM-2012), Springer, 2I ISBN 978-81-322-0756-6, DOI 10.1007/978-81-322-0757-3, 2013

**Saha, P.,** Pal. M. & Sarkar, A. K. (2013). Study on percent time-spent following: a performance measure for two-lane highways. *Advances in Civil Engineering and Building Materials*, Taylor & Francis Group, London, 899-902.

#### **Journals Reviewed by the Faculty Members**

- Journal of Materials in Civil Engineering, ASCE
- Journal of Bridge Engineering, ASCE
- Journal of Engineering Mechanics, ASCE
- Earthquake Spectra, EERI, Cal Tech, USA
- Canadian Geotechnical Journal, Canadian Society of Civil Engineers
- Journal of Computer Methods in Applied Mechanics and Engineering, Elsevier
- Journal of Sound and Vibration, Elsevier
- Journal of Finite Element in Analysis and Design, Elsevier
- Probabilistic Engineering Mechanics, Elsevier
- Structural Safety, Elsevier
- Computers and Structures, Elsevier
- Engineering Structures, Elsevier
- Journal of Hazardous Materials, Elsevier
- Journal of Geotextiles and Geomembranes, Elsevier
- Structural & Multidisciplinary Optimization, Springer
- Journal of Vibration and Control, SAGE
- International Journal of Structural Health Monitoring, SAGE
- International Journal of Materials and Structural Integrity
- Structural Engineering and Mechanics, Korea, Techno Press
- Journal of Zhejiang University Science, China
- Journal of Civil Engineering and Management, BENTHAM
- Journal of Structural Engineering, SERC, Chennai
- Indian Geotechnical Journal
- ISET Journal of Earthquake Technology
- Journal of Geomechanics-ASCE
- Indian Geotechnical Journal
- Desalination
- Desalination and Water Treatment
- Colloids and Surfaces A: Physicochemical and Engineering Aspects
- Journal of Environmental Management

#### **Seminar / Workshops / Conferences / Training programme organized by the Department**

- Organized a 2-day Workshop jointly on Advances in Structural Vibration Control during August 19th – 20th, 2013
- Workshop on “*Advances in the Design and Construction of Bituminous Pavements*” during May 27-28, 2014.
- National Workshop on “Arsenic Pollution and Health in Rural Bengal”, December 13, 2013 National Workshop on “Training of ISGP project personnel On ground water and water quality”, March 03–07, 2014
- Workshop on ‘Ground Water and Water Quality’ 03-07 March, 2014.
- Organized 1-week Training Program for ISGP Personnel under Panchayat&RuralDevelopment Department, Government of West Bengal during March 03 - 07, 2014

#### **Technology Developed and Innovation**

- Development and Installation of a Highly Successful and Socially Accepted “Amal Arsenic Filter” at several Arsenic affected Villages in West Bengal. A new technique for electrochlorination has been developed and tested in the field.
- Development of High Strength High Volume Fly Ash Concrete (1<sup>st</sup> time in India)
- Technology development for high performance Steel Fibre Reinforced Concrete.

#### **Others**

Mr. Alec Bernstein, University of Massachusetts, Amherst, Massachusetts worked for 10 months for research on ‘sustainable rural development water projects’ under Fulbright Fellowship in the Department of Civil Engineering, BESUS.

### **Members of Various Professional Bodies**

- The American Society of Civil Engineers (ASCE, SEI , EMI)
- The Indian National Academy of Engineering
- The Institution of Engineers (India)
- The Indian Society of Earthquake Technology (ISET)
- Indian Roads Congress
- Indian Association of Structural Engineering (IASE)
- Indian Society for Wind Engineering (ISWE)
- Indian Society for Construction Materials and Structures
- The Institute of Steel Development and Growth (INSDAG)

### **Milestones**

- Started as Civil Engineering College on 24<sup>th</sup> November 1856, in the premises of the Writers’ Buildings, Calcutta
- First Degree Examination in 1864
- First Post Graduate Course introduced in 1954 (first time in India)
- Faculty exchange program with University of Wisconsin in 1954
- Had the distinction of having pioneers in Engineering like Prof. Gerald Pickette, Prof. James R. Villemonte, Prof. Paul And, Prof. R.L. Daugherty, Prof. A.C. Ingersoll, as visiting faculty members under the TMC scheme with USA
- Selected as Teachers’ Training Institute Centre in 1959
- First PhD in Engineering in 1962
- QIP Centre for M.E. (Civil) in 1990
- In 2007 the Department celebrated its 150<sup>th</sup> Anniversary by organizing an International Conference on Civil Engineering in the New Millennium: Opportunities and Challenges.
- In 2008 the School of Disaster Mitigation Engineering was established with initiative from this Department.
- In 2008 the Advanced Centre for Environment and Water Resources Engineering was established in collaboration with Queen’s University, Belfast.
- QIP Centre for PhD (Civil) in 2006 In 2005 the Department was recognized as one of the State Technical Agencies (STA) under the Pradhan Mantri Gram Sadak Yojana.

### **Illustrious Alumni**

- Rai Bahadur Anukul Ch. Mitra (1900) Engineering In-charge of construction of Victoria Memorial Hall, Calcutta.
- Rai Bahadur Girish Ch. Da (1891) Engg. In Charge, High Court Building, Calcutta.
- Dr. Fazlur Rahman Khan, Pioneer in Structural Engineering
- Dr. Kajal Gupta, Chief Technologist, NASA-DFRC, USA.
- Dr. B.C. Ganguly, Former Chairman, Indian Railway Board
- Dr. P.K. Basu, Former Chair, C.E. Department, Vanderbilt University
- Shri Amrit Das, Founder Chairman, Research Engineers Inc. USA
- Dr. Sriman Kumar Bhattacharya, Director, Central Building Research Institute
- Dr. Subhomay Gangopadhyay, Director, Central Road Research Institute.

## *Department of Chemistry*



### About the Department:

The more than hundred years old department has a glorious past. The Department, besides engaging itself in undergraduate teaching has a heritage of conducting research in various fields. A well-known Physical Chemist, was the Head of the Department of Chemistry & Metallurgy and the first Vice-Principal (Academic) of the College. Under his direct supervision and through his encouragement, faculty members and several research students made significant contributions in soil chemistry, corrosion, chemical exploration of medicinal plants and a way of coal and petroleum products. At present the faculty members are involved in research in the frontier areas of Chemistry and Chemical Physics, which include Coordination & Bioinorganic Chemistry, Carbohydrate Chemistry, Electrochemistry & Corrosion Science, Fuel Cell Technology, Molecular Recognition & Supramolecular Chemistry, Structural Chemistry, Catalysis, Synthetic Organic & Organometallic Chemistry, Thin Film Semiconductor, Solar Photo-voltaic & Photo-electrochemical Cells, Non-linear Optical Phenomena: Modeling & Computation, Non-equilibrium Statistical Mechanics, Relativistic & non-relativistic Electronic Structure Theory. The two year (four semesters) M. Sc. Course in Chemistry offered by the department is designed to satisfy the needs of academia and industries. The department is endowed with a number of research projects sponsored by various funding agencies. The department has also been selected for MHRD special grant and DST-FIST and UGC-SAP programme. About seventy research students under the Ph.D. program are currently working in the various fields of chemical sciences.

### Academic Programmes:

#### Post graduate level:

- (i) Degree offered: M.Sc.
- (ii) Sanctioned students' Intake: 30
- (iii) Specialization in: Physical Chemistry, Inorganic Chemistry & Organic Chemistry

#### Doctoral & Post Doctoral Research Programme

- (i) Degree offered: **Ph.D. (Science)**
- (ii) No. of candidates enrolled: 16
- (iii) No. of candidates registered: 24
- (iv) No. of candidates awarded: 25
- (v) No. of Post Doctoral candidates : 04 (D S Kothari/UGC/CSIR)

### Faculty position

Sanctioned Faculty Post: **15**      Vacant Posts: **02**

Faculty profile (in the following table)

| Name              | Designation | Highest Qualification | Specialization/ Research Area                      | Contact No.<br>E.mail                   |
|-------------------|-------------|-----------------------|--|---|
| Dr. S. P. Goswami | Professor   | Ph.D.                 | Molecular Recognition and Supramolecular Chemistry | 9433301414<br>spgoswamical@yahoo.com    |
| Dr. B. Adhikary   | Professor   | Ph.D.                 | Nanomaterials and Co-ordination Chemistry          | 033 25385701<br>adhikarybibhu@yahoo.com |

|                             |                     |       |  |  |
|-----------------------------|---------------------|-------|--|--|
| Dr. (Mrs.) J. Dutta         | Professor           | Ph.D. | Electrochemical Nanoscience, Fuel Cells, Solar Cells   | 09830029798<br>jayati_datta@rediffmail.com                                   |
| Dr. A. Mondal               | Professor           | Ph.D. | Thin film semiconductors and solar cells   | 9681420714<br>anupmondal2000@yahoo.co.in                                     |
| Dr. S. K. Chattopadhyay     | Professor           | Ph.D. | Coordination Chemistry, Bioinorganic Chemistry   | 9874339079<br>shyamalchattopadhyay@gmail.com                                 |
| Dr. P. K. Nandi             | Professor & Head    | Ph.D. | NonLinear Optics: Modeling and Computation   | 9432177021<br>Nandi_pk@yahoo.co.in   |
| Dr. B. K. Ghorai            | Professor           | Ph.D. | Synthetic Organic, Organometallic and Materials chemistry  | 9433843142<br>bkghorai@yahoo.co.in   |
| Dr. Sudip Kr. Chattopadhyay | Professor           | Ph.D. | Theoretical Molecular Sciences   | 9433144725<br>sudip_chattopadhyay@rediffmail.com                             |
| Dr. A. K. Mahapatra         | Professor           | Ph.D. | Design, Synthesis and Recognition of Bio-active Molecules  | 9434508013<br>akmahapatra@rediffmail.com                                     |
| Dr. (Mrs.) J. Ganguly       | Assistant Professor | Ph.D. | Carbohydrate Chemistry   | gangulyjhuma@yahoo.com   |
| Dr. C. Bhattacharya         | Assistant Professor | Ph.D. | Photoelectrochemical Solar Cells, Conducting Polymers, Corrosion Science   | 09433639041<br>c.bhattacharya@rediffmail.com                                 |
| Dr. P. Biswas               | Assistant Professor | Ph.D. | Coordination and Bioinorganic Chemistry, catalysis, nanomaterials  | 09433135103<br>biswaspapu@rediffmail.com                                     |
| Dr. N.D. Paul               | Assistant Professor | Ph.D. | Ligand Design and Studies of their coordination Chemistry, Application of 'Redox Non-Innocent' & Cooperative Ligands in Catalysis, 'Redox-Active' Transition Metal Complexes in Molecular Electronic Application, Mechanistic investigation using Density Functional | 08902431148<br><u><a href="mailto:ndpaul@gmail.com">ndpaul@gmail.com</a></u> |

|                           |  |       |   |   |
|---------------------------|--|-------|---|---|
|                           |  |       | Theory (DFT) Coupled with Different Spectroscopic Techniques.   |   |
| Prof. Sabyasachi Sarkar   | Honorary Emeritus Professor and Ramanna Fellow | Ph.D. | Inorganic Chemistry and Bioinorganic /Biophysical Chemistry, Chemical Darwinism, Analytical and Environmental, Energy, Nano Science, Theoretical Chemistry, Spectroscopies and X-ray Crystallography. | +91-8902499683<br>abya@iitk.ac.in,<br>protozyme@gmail.com,<br>sabby@chem.becs.ac.in |
| Prof. Dulal Chandra Ghosh | UGC Emeritus Professor                         | Ph.D. | Theoretical Chemistry   | +91-9433389909  |

**Awards and Laurels received by the faculty members:**

1. Prof. Sudip Chattopadhyay received the 2014 Young Faculty Research Award sponsored through BECAA-WMA and GAA-BESU Shibpur US Foundation.
2. Prof. S. Sarkar was awarded Professor Priyadarajan Ray Memorial Award, by Council of the Indian Chemical Society conferred in 2013 .
3. Prof. S. Sarkar was honored as the Fellow of the Royal Society of Chemistry in 2013.

**Research Area** (only mention broad titles without description in detail):

1. Coordination & Bioinorganic Chemistry
2. Glycobiology
3. Electrochemistry, Non-conventional Energy, Fuel Cell, Corrosion Science.
4. Molecular Recognition & Organic Synthesis
5. Synthetic Organic, Organometallic and Materials Chemistry
6. Thin Film Semiconductors, Solar Photo-voltaic, Photo-electrochemical Solar Cells
7. Theoretical and Computational Chemistry, Theoretical Molecular Sciences
8. Conducting Polymers & Photoelectrochemical Solar Cell
9. Inorganic Chemistry and Bioinorganic /Biophysical Chemistry, Chemical Darwinism, and Analytical and Environmental
10. Energy, Nano Science, Spectroscopies and X-ray Crystallography

**Research Facilities:** (name specific equipment / picture etc.)

1. Spectrofluorimeter
2. Luminescence Spectrometer
3. Atomic Absorption Spectrophotometer
4. Potentiostat – Galvanostat
5. Optical Microscope with image analyzer
6. TG-DTA-cum-DSC System
7. Vacuum Coating unit
8. Electrochemical Quartz Crystal Microbalance System



9. FTIR with FT-Raman Spectrophotometer
10. Analytical cum Preparative HPLC with Mass Detector
11. Microwave Synthesizer
12. Chemisorption and Physisorption Measuring Unit
13. Fuel Cell / Solar Characterization System
14. Semiconductor Characterization System
15. Monochromator / Radiometer
16. UV-Visible Spectrophotometer
17. Hall Effect Setup
18. Ion-Chromatograph
19. PGSTAT 12 with Frequency Response Analyzer
20. AUTOLAB 30 Potentiostat/Galvanostat
21. PAR Versastat-II Potentiostat and electrochemistry system
22. Precision L-C-R Meter

**Name of the Laboratories:**

1. Coordination & Bioinorganic Chemistry
2. Glycobiology
3. Electrochemical Nano Science, Fuel Cell and Solar Cells.
4. Molecular Recognition & Organic Synthesis
5. Synthetic Organic and Organometallic Chemistry
6. Thin Film Semiconductors & Solar cells
7. Theoretical and Computational Chemistry
8. Theoretical Molecular Sciences
9. Conducting Polymers & Photoelectrochemical Solar Cell
10. Nano Imaging and Artificial photo synthesis

**Consultancy work:**

Development of nanotechnology for the de-salination of sea water “- a consultancy project from DESNOZ Inc., Raleigh, NC, USA (project cost: 4.8 Lakh) (S Sarkar)

**Support Staff position:**

- (i) Sanctioned technical Post: **08** Vacant: **03**  
 (ii) Technical staff profile (in the following table):

| Name      | Designation              | Highest Qualification | Contact No. |
|-----------|--------------------------|-----------------------|-------------|
| S. Munshi | Technical Assistant- II  | M.Sc.                 | 9432307325  |
| R. Halder | Technical Assistant - II | B.Sc. (2 years)       | 9547215236  |
| B. Das    | Sore Helper              | Madhyamik             | 9674774122  |
| J. Ali    | Sr. peon                 | Madhyamik             | 9733930005  |
| J. Roy    | Helper 1                 | Class-VIII            | 9231897280  |

**Ongoing Sponsored Research / projects: (mention area)**

| Ongoing (Prop value) in Lakhs | Sponsoring agencies |
|-------------------------------|---------------------|
| 73.4                          | CSIR                |
| 14.6                          | UGC                 |
| 334.2                         | DST                 |
| 110.4                         | DST-SERI            |
| 30.6                          | MNRE                |
| 14.7                          | DST (W.B.)          |
| 14.6                          | DBT                 |
| 25.0                          | BRNS                |
| 9.0                           | AICTE               |
| 5.0                           | Cormoz Inc. USA     |

**Industry – Institute Interaction:**

Development of nanotechnology for the de-salination of sea water “- a consultancy project from DESNOZ Inc., Raleigh, NC, USA

**Details of publications: (2013 - 14)**

Journal: 147  
 Conference: 27  
 Books/Monographs: 1  
 (List to be included)

"Sizing" giant molybdenum-oxide based molecular spheres of the Keplerate type, Sabyasachi Sarkar in "Molybdenum and its compounds application and electrochemical properties and geological implication", Nova Science Publishers Inc.,(2014), 1, 3-8.

**Patents / Invention Disclosure / Technology Transfer / Copyright:****Patents:**

1. US patent approved: Water Soluble Fluorescent Quantum Carbon Dots, Patent Number: US 8357507B2 (approved on January 22, 2013)

**Seminar / Workshops / Conferences/ Training programme organized by the Department (2013-14):**

Science Academies' Lecture Workshop on Recent Progress in Chemistry (December 26 -28, 2013), organized by Department of Chemistry, BESU, Shibpur and South Howrah Citizen's Forum and Sponsored by Indian Academy of Sciences, The National Academy of Sciences and Indian National Science Academy.

**Foreign visits and Invited Lectures****Foreign Visit by Prof. Jayati Datta**

**Chair person and Invited speaker**, BIT's 4<sup>th</sup> Annual World Congress of Nano Science and Technology, 2014, Qingdao, China, **October, 28-31, 2014**

**Foreign Viist by Prof. Sabyasachi Sarkar**

1. MIT, USA, June, 2013
2. University of Lisbon, Portugal, July, 2013
3. University of Bielefeld, Germany, July, 2013
4. Nano-science Center, Cairo, Egypt, April, 2014

**Invited Lecture by Prof. B.K. Ghorai**

1. “Annulations using Fischer carbene complexes for construction of fused azaheterocycles” at **Chemistry Division, BARC, Tombay, Mumbai** on May 17, 2013.
2. “Applications of Fischer carbene complex to the synthesis of fused azaheterocycles of biological importance” at Symposium on *Chemistry of Organometallics and its application to society (COAS)* held at the **Department of Chemistry, Salipur College, Salipur, Cuttack, Odisha, India** on September 14–15, 2013.

**Invited Lecture by Prof. A. K. Mahapatra**

1. Fluoro- and chromogenic chemodosimeters for toxic ion detection, 50<sup>th</sup> Annual Convention of Chemists 2013, Department of Chemistry, Panjab University, Chandigarh

**Invited Lecture by Prof. S. K. Chattopadhyay**

1. Academic Staff Colleges at J.U.)

**Invited Lecture by Prof. Sabyasachi Sarkar**

1. “DST INSPIRE Internship Camp” at Visva-Bharati, Santiniketan, Inida, September 2014
2. "Frontiers in Chemical Sciences 2014", at Vidyasagar University, India, August, 2014.
3. “Mastering in molecules and materials( M<sup>3</sup>-2014)” at NIT, Kurukshetra, October, 2014.
4. Academy Lectures – at Tejpur University, Assam- 2013
5. Nano science -2014, Rajiv Gandhi University, Arunachal Pradesh-2014
- 6.. Chemical Evolution-2013, IIT Roorke, 2013
7. Lecture to College Teachers at Burdwan University- 2014
8. Lecture to College Teachers at Calcutta University -2013
9. Lectures to College Teachers at North Bengal University -2014
10. Lectures to M.Sc., B.S students at IIT-Guhawati -2014
11. Lecture seminar, NIT –Jaipur- December, 2013
12. Lecture seminar to NIT-Agartala- January 2014
13. Lecture seminar – Indrapastha University, ( Formerly Delhi College of Engineering) Delhi -2014
14. Biannual Conference of Global Graduates on Quality of our PhDs, at India Habitat Center, Delhi -2014
15. Prof P.Ray Memorial Lecture, Convention of Chemists, Chandigarh University-December-2013
16. Chairing the inaugural academic session at MTIC held at IIT-Roorke-2013

**Training and Placement: 20**

## New Academic / Research Initiatives

### Academic Collaboration

1. Dr. Nikhil R. Jana, Centre for Advanced Materials, Indian Association of Cultivation of Science, Jadavpur, Kolkata. (**Prof. B.K.Ghorai**)
2. Prof. Pralay Maity, School of Materials Science and Technology, Indian Institute of Technology (BHU), Varanasi, UP. (**Prof. B.K.Ghorai**)
3. Central Salt and Marine Chemicals Research Institute, Gijubhai, Badheka Marg, Bhavnagar 364002, Gujarat, India (**Prof. B. Adhikary**).
4. **Dr. C. Bhattacharyya started collaboration with (i) BARC, Mumbai, (ii) CECRI-CSIR, Karaikudi (iii) BITS, Pilani**
5. Institute for Stroke and Dementia Research, LMU, Munich-81377, Germany. (**Prof. S. Sarkar**).
6. REQUIMTE/CQFB, Departamento de Química, FCT, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal. (**Prof. S. Sarkar**)
7. Prof. Debasis Das, Department of Chemistry, University of Calcutta. (Prof. S. K. Chattopadhyay)

### Industrial Collaboration:

CromozInc, 2 Davis Drive, Research Triangle Park, North Carolina, USA

## List of details of publications of each faculty member:

### Prof. Sudip Kumar Chattopadhyay

1. K. Adhikari, **S. Chattopadhyay**, B. K. De, A. Sharma, R. K. Nath, and D. Sinha, *J. Comp. Chem.* **2013**, 34, 1291.
2. R. K. Chaudhuri, **S. Chattopadhyay**, K.F. Freed, U. S. Mahapatra, *J. Phys. Chem. A*, **2013**, 117, 9424.
3. **S. Chattopadhyay**, R.K. Chaudhuri, U.S. Mahapatra, *J. Phys. Chem. A*, **2013**, 117, 8555.
4. R.K. Chaudhuri, **S. Chattopadhyay**, U.S. Mahapatra, *J. Phys. Chem. A*, **2013**, 117, 12616.
5. A. Shit, **S. Chattopadhyay**, J. Ray Chaudhuri, *Eur. J. Phys. B*, **2013**, 86, 23.
6. A. Shit, **S. Chattopadhyay**, J. Ray Chaudhuri, *J. Phys. Chem. A*, **2013**, 117, 8576.
7. A. K. Maity, **S. Chattopadhyay**, J. Ray Chaudhuri, R. Metzler, P. Chaudhuri, S.K. Banik, *Phys. Rev. E*. **2013**, 88, 032716.

### Dr. Jhuma Ganguly

1. **J Ganguly**, RW Carlson , EL Kannenberg, Glycobiology, 23(7):820-32, **2013**
2. PK Paul, **J. Ganguly**, M.Ghosh, IJCSSEIT, Vol.6 No.2 ,92-96, **2013**.

### Dr. Nanda Dulal Paul

1. D. Sengupta, P. Ghosh, T. Chatterjee, H. Datta, **N. D. Paul**, S. Goswami, *Inorg. Chem.* **2014**, Doi: 10.1021/ic501656s.
2. **Nanda D. Paul**, P. Gualco. B. de Bruin, *Willey-VCH. (Invited Book Chapter)* (in press).

### Dr. Papu Biswas

1. Amit Kumar Dutta, Sudipto Das, Partha Kumar Samanta, Shounak Roy, Bibhutosha Adhikary, **Papu Biswas**, *Electrochimica Acta*, **2014**, 144, 282–287.
2. Suvendu Samanta, Sudipto Das, **Papu Biswas**, *Sensors and Actuators B*, **2014**, 202, 23–30.
3. **Papu Biswas**, Pradip Bag, Amit Kumar Dutta, Ulrich Flörke, Kamalaksha Nag, *Polyhedron*, **2014**, 75, 118–126.
4. Suvendu Samanta, Sudipto Das, and **Papu Biswas**, *J. Org. Chem.* **2013**, 78, 11184–11193.
5. Suvendu Samanta, Sudipto Das, Partha Kumar Samanta, Supriya Dutta and **Papu Biswas**, *RSC Advances*, **2013**, 3, 19455–19466.
6. Sudipto Das, Suvendu Samanta, Swarup Kumar Maji, Partha Kumar Samanta, Amit Kumar Dutta, Divesh N. Srivastava, Bibhutosha Adhikary, **Papu Biswas**, *Tetrahedron Letters*, **2013**, 54, 1090–1096.
7. Amit Kumar Dutta, Swarup Kumar Maji, **Papu Biswas**, Bibhutosha Adhikary, *Sensors and Actuators B*, **2013**, 177, 676–683.
8. Pradip Bag, Swarup Kumar Maji, **Papu Biswas**, Ulrich Flörke, Kamalaksha Nag, *Polyhedron*, **2013**, 52, 976–985.
9. Amit Kumar Dutta, Sudipto Das, Suvendu Samanta, Partha Kumar Samanta, Bibhutosha Adhikary, **Papu Biswas**, *Talanta*, **2013**, 107, 361–367.

### Prof. Binay K. Ghorai

1. P. Roy, **B. K. Ghorai**, *Tetrahedron Lett.* **2013**, 54, 1440–1443.
2. D. Jana, S. Boxi and **B. K. Ghorai**, *Dyes and Pigments* **2013**, 99, 740–747.
3. D. Jana and **B. K. Ghorai**, *Tetrahedron Lett.* **2014**, 55, 5203–5206.
4. D. Jana and **B. K. Ghorai**, *Bull. Chem. Soc. Jpn.*, **2014**, doi: 10.1246/bcsj.20140178.

### Prof. Prasanta K. Nandi

1. K. Hatua and **P. K. Nandi** (2014): *J. Mol. Model.*, **20**, 2440 -2449.
2. K. Hatua and **P. K. Nandi** (2014): *J. Theor. Comput. Chem.*, **13**, 14500391- 12.

3. S.Goswami, S.Das, K. Aich, **P. K. Nandi**, K.Ghoshal, C. K. Quah, M. Bhattacharyya, H.-K. Fun and H.A. Abdel-Aziz (2014): *RSC Adv.* **4**, 24881-24886.
4. S. Goswami, A. Manna, S.Paul, A.K. Das, **P.K. Nandi**, A.K. Maity and P. Saha (2014): *Tetrahedron Letters* **55**, 490 – 494.
5. S. K. Sau, A. Giri, T. K. Manna, **P. K. Nandi** (2014): *Int. J. Adv. Tech. Eng. Sc.* **2**, 229 – 234.
6. K. Hatua and **P. K. Nandi** (2013): *J. Phys. Chem. A* **117** 12581 - 12589.
7. K. Hatua and **P. K. Nandi** (2013): *J. Theor. Comput. Chem.* **12** 1350075 (p. 1-13).
8. S. Goswami, A. Manna, S.Paul, A. K. Das, K. Aich and **P.K. Nandi** (2013): *Chem. Commun.* **49** 2912 – 2914.
9. K. Hatua and **P. K. Nandi** (2013): *J. Theor. Comput. Chem.* **12** 1350046 (p.1-11).
10. A. K. Mahapatra, K. Maiti, P. Sahoo and **P. K. Nandi** (2013): *Journal of Luminescence* **143**, 349 - 354.
11. U. Saha, T. K. Si, **P. K. Nandi** and K. K. Mukherjea (2013): *Inorganic Chemistry Communications*, **38**, 43-46.
12. K. Hatua and **P. K. Nandi** (2013): *J. Theor. Comput. Chem.* **12** 1250099 (p. 1-25).
13. S. K. Sau, T. K. Manna, A. Giri and **P. K. Nandi** (2013): *Int. J. Sc. Research*, **2**, 60 – 64.
14. S. K. Sau, **P. K. Nandi**, A. Giri and T. K. Manna (2013): *Int. J. Sc. Eng. and Tech. Research*, **2**, 2107 – 2110.
15. S. K. Sau, T. K. Manna, A. Giri and **P. K. Nandi** (2013): *Int. J. Chem. Eng. Research*, **5**, 139 – 146.

**Prof. Ajit Kumar Mahapatra**

1. **A. K. Mahapatra**, G. Hazra, S. K. Mukhopadhyay, A. R. Mukhopadhyay, *Tetrahedron Lett.*, **2013**, *54*, 1164-1168.
2. **A. K. Mahapatra**, J. Roy, P. Sahoo, S. K. Mukhopadhyay, A. Banik, D. Mandal *Tetrahedron Lett.*, **2013**, *54*, 2946-2951.
3. A. K. Mahapatra, S. K. Manna, S. K. Mukhopadhyay, A. Banik *Sensors and Actuators B: Chemical*, **2013**, *183*, 350-355.
4. A. K. Mahapatra, K. Maiti, P. Sahoo, P. K. Nandi, *Journal of Luminescence*, **2013**, *143*, 349-354.
5. A. K. Mahapatra, S. K. Manna, D. Mandal, C. D. Mukhopadhyay, *Inorg. Chem.* **2013**, *52*, 10825–10834.
6. **A. K. Mahapatra**, R. Maji, K. Maiti, S. S. Adhikari, C. D. Mukhopadhyay, D. Mandal, *Analyst*, **2014**, *139*, 309-317.
7. **A. K. Mahapatra**, S. K. Manna, C. D. Mukhopadhyay, D. Mandal, *Sensors and Actuators B: Chemical*, **2014**, *200*, 123–131.
8. **A. K. Mahapatra**, S. K. Manna, K. Maiti, R. Maji, C. D. Mukhopadhyay, D. Sarkar, T. K. Mondal *RSC Adv.*, **2014**, *4*, 36615-36622.
9. **A. K. Mahapatra**, K. Maiti, S. K. Manna, R. Maji, C. D. Mukhopadhyay, B. Pakhira, S. Sarkar, *Chemistry–An Asian Journal* **2014**, DOI: 10.1002/asia.201402923.
10. **A. K. Mahapatra**, S. Mondal, K. Maiti, S. K. Manna, R. Maji, S. Mandal, S. d Goswami, D. Mondal, C. K. Quah, H.-K. Fun, *RSC Advances* **2014**, DOI: 10.1039/C4RA10540K.

**Prof. Bibhutosh Adhikary**

1. A.K. Dutta, S. Das, P. K. Samanta, S. Roy, **B. Adhikary**, P. Biswas, *Electrochimica Acta*. **2014**, 144, 282–287
2. A. K. Dutta, S. K. Maji, K. Mitra, A. Sarkar, N. Saha, A. B. Ghosh, **B. Adhikary**, *Sens. Actuat. B Chem.* 2014, 192, 578–585.
3. A. K. Dutta, S. K. Maji, **B. Adhikary**, *Mat. Res. Bull.* **2014**, 49, 28–34.
4. S. K. Maji, A. K. Dutta, G. R. Bhadu, P. Paul, A. Mondal, **B. Adhikary**, *J. Mater. Chem. B.* **2013**, 1, 4127–4134.
5. S. K. Maji, A. K. Dutta, D.N. Srivastava, P. Paul, A. Mondal, **B. Adhikary**, U. Adhikary, *J. Nanosci. Nanotechnol* **2013**, 13, 4969–4974.
6. A. K. Dutta, S. Das, S. Samanta, P. K. Samanta, **B. Adhikary**, P. Biswas, *Talanta*. **2013**, 107, 361–367.
7. B. Chakraborty, B. Show, S. Jana, B. C. Mitra, S. K. Maji, **B. Adhikary**, N. Mukherjee, A. Mondal, *Electrochim. Acta*. **2013**, 94, 7–15.
8. A. K. Dutta, S. K. Maji, P. Biswas, **B. Adhikary**, *Sens. Actuat. B Chem.* **2013**, 177, 676–683.
9. S. Das, S. Samanta, S. K. Maji, P. K. Samanta, A. K. Dutta, D. N. Srivastava, **B. Adhikary**, P. Biswas, *Tetrahedron Lett.* **2013**, 54, 1090–1096.

**Dr. Chinmoy Bhattacharya**

1. H. Mandal, S. Shyamal, P. Hajra, B. Samanta, P. Fageria, S. Pande, **C. Bhattacharya**, *Electrochimica Acta*, **2014**, 141, 294–301.
2. P. Hajra, S. Shyamal, H. Mandal, P. Fageria, S. Pande & **C. Bhattacharya**, *Electrochimica Acta*, Vol. **2014**, 123, 494–500.

**Prof. Jayati Datta**

1. A. Pal, A. Jana, **J. Datta**, *Energy and Environmental Science*—Under Review—**2014**
2. A. Datta, A. Mondal, **J. Datta**, *J. Power Sources*—In press—**2014**
3. P. Hazra, A. Jana, M. Hazra, **J. Datta**, *RSC Advance*, **2014**, 4, 33662–33671
4. A. Dutta, **J. Datta**, *J. Mater. Chem. A*, 2014, 2, 3237
5. A. Dutta, **J. Datta**, *Int. J. Hydrogen Energy* **2013**, 38, 7789.
6. A. Jana, **J. Datta**, *J. Electroanalytical Chemistry*, **2013**, 689, 31–41.

**Prof. Anup Mondal**

1. B. B. Show, N. Mukherjee, **A. Mondal**, *RSC Adv.*, **2014**, 4, 58740
2. S. Jana, **A. Mondal**, *ACS Appl. Mater. Interfaces* **2014**, 6, 15832–15840
3. A. Ghosh, B. B. Show, S. Ghosh, N. Mukherjee, G. Bhattacharya, S. K. Datta, **A. Mondal**, *RSC Adv.*, **2014**, 4, 51569
4. S. Jana, P. Bera, B. Chakraborty, B. C. Mitra, **A. Mondal**, *Applied Surface Science*, **2014**, 317, 154–159
5. S. Jana, S. Samai, B. C. Mitra, P. Bera, **A. Mondal**, *Dalton Trans.*, **2014**, 43, 13096
6. G. Mondal, P. Bera, A. Santra, S. Jana, T. Mondal, **A. Mondal**, S. I. Seok, P. Bera, *New J. Chem.*, **2014**, 38, 4774

7. S. Jana, G. Mondal, B. C. Mitra, P. Bera, **A. Mondal**, *Chemical Physics* **2014**, 439, 44–48
8. S. Jana, B. C. Mitra, P. Bera, M. Sikdar, **A. Mondal**, *Journal of Alloys and Compounds*, **2014**, 602 42–48
9. S. Jana, N. Mukherjee, B. Chakraborty, B. C. Mitra, **A. Mondal**, *Applied Surface Science*, **2014**, 300, 154–158
10. S. Jana, S. K. Bhar, N. Mukherjee, **A. Mondal**, *Materials Letters* **2013**, 10951–54
11. S. Jana, S. Das, D. De, U. Gangopadhyay, P. Ghosh, **A. Mondal**, *Appl Phys A*, DOI 10.1007/s00339-013-8044-1
12. S. K. Maji, A. K. Dutta, G. R. Bhadu, P. Paul, **A. Mondal**, B. Adhikary, *Journal of Materials Chemistry B*, DOI: 10.1039/b000000x
13. S. K. Maji, A. K. Dutta, D. N. Srivastava, P. Paul, **A. Mondal**, B. Adhikary, and U. Adhikary, *Journal of Nanoscience and Nanotechnology*, **2013**, 13 4969–4974
14. S. Jana, S. Das, U. Gangopadhyay, **A. Mondal**, P. Ghosh, *Advances in Tribology*, Volume 2013, Article ID 352387, <http://dx.doi.org/10.1155/2013/352387>
15. U. Gangopadhyay, S. Jana, S. Das, P. Ghosh, **A. Mondal**, *Journal of Renewable And Sustainable Energy* **2013**, 5, 031607(1-9)
16. B. Chakraborty, B. B. Show, S. Jana, B. C. Mitra, S. K. Maji, B. Adhikary, N. Mukherjee, **A. Mondal**, *Electrochimica Acta* **2013**, 94, 7–15
17. S. K. Bhar, S. Jana, **A. Mondal**, N. Mukherjee, *Journal of Colloid and Interface Science*, **2013**, 393 286-290

**Prof. Shyamal Kumar Chattopadhyay**

1. C. Das, P. Adak, S. Mondal, R. Sekiya, R. Kuroda, S. I. Gorelsky, **S. K. Chattopadhyay**, *Inorg. Chem.* **2014**, 53, 11426-11437.
2. P. Chakraborty, J. Adhikary, B. Ghosh, R. Sanyal, **S. K. Chattopadhyay**, A. Bauzá, A. Frontera, E. Zangrando, D. Das, *Inorg. Chem.* **2014**, 53, 8257-8269.
3. S. Mondal, P. Adak, C. Das, S. Naskar, B. Pakhira, A. J. Blake, A. L. Rheingold, E. Sinn, C. S. Eribal, **S. K. Chattopadhyay**, *Polyhedron*, **2014**, 81, 428-435.
4. S. Mondal, C. Das, B. Ghosh, B. Pakhira, A. J. Blake, M. G. B. Drew, **S. K. Chattopadhyay**, *Polyhedron*, **2014**, 80, 272-281 (*invited publication for Prof. V. M. Leovac special issue*).
5. T. Samanta, L. Dey, J. Dinda, **S. K. Chattopadhyay**, S. Seth, *J. Mol. Str.* **2014**, 1068, 58-70 ()
6. B. Ghosh, S. Naskar, S. Naskar, A. Espinosa, S. C. K. Hau, T. C. W. Mak, R. Sekiya, R. Kuroda, **S. K. Chattopadhyay**, *Polyhedron*, **2014**, 72, 115-121.
7. J. Dinda, T. Samanta, A. Nandy, K. Das Saha, S. Seth, **S. K. Chattopadhyay**, C. W. Bielawski, *New. J. Chem.*, **2014**, 38, 1218-1224.
8. T. Samanta, S. K. Seth, **S. K. Chattopadhyay**, P. Mitra, V. Kushwah, J. Dinda, *Inorg. Chim. Acta*, **2014**, 411, 165-171.
9. J. Adhikary, P. Chakraborty, S. Das, T. Chattopadhyay, A. Bauzá, **S. K. Chattopadhyay**, B. Ghosh, F. A. Mautner, A. Fontera, D. Das, *Inorg. Chem.* **2013**, 52, 13442-13452.
10. S. Naskar, S. Naskar, R. J. Butcer, M. Corbella, A. E. Ferao, **S. K. Chattopadhyay**, *Eur. J. Inorg. Chem.* **2013**, 3249-3260.
11. S. Mondal, S. Naskar, A. K. Dey, E. Sinn, C. Eribal, S. R. Herron, **S. K. Chattopadhyay**, *Inorg. Chim. Acta*, **2013**, 398, 98-105.



**Prof. Shyamaprosad Goswami**

1. **S. Goswami**, D. Sen, A. K. Das, N. K. Das, K. Aich, H.-K. Fun, C. K. Quah, A. K. Maity, P. Saha, *Sensors and Actuators B: Chemical*, 2013, 185, 518-525
2. H.-K. Fun, C. K. Quah, K. Aich, S. Das and **S. Goswami**, *Acta crystallographica section E* (2013), E69.
3. H.-K. Fun, C. K. Quah, K. Aich, S. Das and **S. Goswami**, *Acta crystallographica section E* (2013), E69.
4. S. Seth, N. K. Das, K. Aich, H.-K. Fun, C. K. Quah and **S. Goswami**, *Journal of Molecular Structure*, 2013, 1048, 157-165.
5. **S. Goswami**, A. K. Das, K. Aich, A. Manna, *Tetrahedron letters*, 2013, 32, 4215-4220.
6. **S. Goswami**, S. Das and K. Aich, *Tetrahedron Letters*, 2013, accepted Manuscript
7. S. Goswami, S. Paul and A. Manna, *RSC. Advances*, 2013, 3, 10639-10643.
8. **S. Goswami**, S. Paul and A. Manna, *Dalton Trans.*, 2013, 42, 10682-10686.
9. S. Goswami, A. K. Das, K. Aich, A. Manna, S. Maity, K. Khanra and N. Bhattacharyya *Analyst*, 2013, 4593-4598.
10. **S. Goswami**, S. Paul and A. Manna, *Dalton Trans.*, 2013, 42, 10097-10101.
11. **S. Goswami**, A. Manna, S. Paul, A. K. Das, K. Aich and P. K. Nandi, *Chem. Commun.* 2013, 49, 2912-2914.
12. **S. Goswami**, A. Manna, S. Paul, K. Aich, A. K. Das and S. Chakraborty, *Tetrahedron Letters*, 2013, 54, 1785-1789.
13. **S. Goswami**, A. Manna, S. Paul, K. Aich, A. K. Das and S. Chakraborty, *Dalton Trans.*, 2013, 42, 8078-8085.
14. **S. Goswami**, A. C. Maity, S. Chakraborty, M. K. Das and B. Goswami, *Tetrahedron Letters*, 2013, 54, 2373-2376.
15. **S. Goswami**, K. Aich, S. Das, A. K. Das, A. Manna and S. Halder, *Analyst*, 2013, 138, 1903-1907.
16. **S. Goswami**, K. Aich, A. K. Das, A. Manna and S. Das, *RSC Advances*, 2013, 3, 2412-2416.
17. **S. Goswami**, S. Maity, A. K. Das, A. C. Maity, T. K. Mandal, S. Samanta, *Tetrahedron Letters, In Press, Accepted Manuscript*.
18. **S. Goswami**, S. Chakraborty, S. Paul, S. Halder, A. C. Maity, *Tetrahedron letters*, accepted manuscript.
19. **S. Goswami**, A. Manna, A. K. Maity, S. Paul, A. K. Das, M. K. Das, P. Saha, C.-K. Quah and H.-K. Fun. *Dalton Trans*, accepted manuscript.

**Prof. Sabyasachi Sarkar**

1. S. Goswami, S. Chakraborty, M. K. Adak, S. Halder, C. K. Quah, H. K. Fun, B. Pakhira and **S. Sarkar**, *New J. Chem.* **2014**, 00,00-00.
2. A. Mahapatra, K. Maiti, S. Manna, R. Maji, C. Mukhopadhyay, B. Pakhira and **S. Sarkar**, *Chem. Asian. J.* **2014**, 00,00-00.
3. A. Begum, K. M. Tripathi and **S. Sarkar**, *Chem. Eur. J.* **2014**, 00, 00-00.
4. S. Tripathi and **S. Sarkar**, *Appl. Nanosci.* **2014**, DOI: 10.1007/s13204-014-0355-9
5. M. Saxena, S. Maity and **S. Sarkar**, *RSC Adv.* **2014**, 4, 39948-39954.
6. K. M. Tripathi, A. K. Sonkar, S. K. Sonkar and **S. Sarkar**, *RSC Adv.* **2014**, 4, 30100-30107.
7. S. Goswami, A. K. Das, B. Pakhira, S. Basuroy, A. K. Maity, P. Saha and **S. Sarkar**, *Dalton Trans.* **2014**, 43, 12689-12697.
8. M. Saxena and **S. Sarkar**, *RSC Adv.* **2014**, 4, 30162-30167.
9. S. Goswami, K. Aich, S. Das, S. B. Roy, B. Pakhira and **S. Sarkar**, *RSC Adv.* **2014**, 4, 14210-14214.
10. S. Sarkar, N. Chatterjee, M. Roy, R. Pal, **S. Sarkar** and A. K. Sen, *RSC Adv.* **2014**, 4, 7024-7029.

11. M. Roy, T. S. Kusurkar, S. K. Maurya S. K.Meena, S. K. Singh, N.Sethy, K. Bhargava, R. K. Sharma, D. Goswami, **S. Sarkar** and M. Das, **3 Biotech.** **2014**, 4, 67-75.
12. D. G. Babar, S. K.Sonkar, K. M.Tripathi and **S. Sarkar**, **J. Nanosci. Nanotechnol.** **2014**,14, 2334-2342.
13. S. K.Sonkar, K. M.Tripathi and **S. Sarkar**, **J. Nanosci. Nanotechnol.** **2014**, 14, 2532-2538.
- 14.M. Bose, G. Moula and **S. Sarkar**, **Inorg.Chem.**,**2014**, 53, 6-8.
- 15.G. Srivastava, A. Das, T. S.Kusurkar, M. Roy, S.Airan, R. K. Sharma, S. K. Singh, **S. Sarkar**, M. Das, **Mater. Express**, **2014**, 4, 23-31.
16. G. Nandi and **S. Sarkar**, **J. Porphyrins Phthalocyanines.****2014**, 18, 282-289 .
- 17.T.Kusurkar, I.Tandon, N.Sethy, K. Bhargava, **S. Sarkar**, S. Singh, and M. Das, **Sci. Rep.** **2013**, DOI: 10.1038/srep03290.
18. G. Nandi and **S. Sarkar**, **Inorg. Chim. Acta. ,** **2013**, 410, 106-110.
19. S.Goswami, S. Das, K.Aich, B. Pakhira, S.Panja, S. K. Mukherjee and **S. Sarkar**, **Org. Lett.** **2013**,15, 5412-5415.
20. M.Saxena, S. K. Sonkar and **S. Sarkar**, **RSC Adv.** **2013**, 3, 22504-22508.
21. J.Mitra, K. Pal and **S. Sarkar**, **Dalton Trans.** **2013**, 42, 13905-13911.
- 22.K. M.Tripathi , A. Begum, S. K.Sonkar and **S. Sarkar**, **New J. Chem.** **2013**, 37, 2708-2715.
23. J.Bhuyan and **S. Sarkar**, **J. Chem. Sci.** **2013**, 125, 1-8.(Dedicated in memory of Prof. P.T. Narasimhan)
24. M. Saxena and **S. Sarkar**, **Mater. Express.** **2013**, 3, 201-209.
25. E. S. A. Nouh, M. Roy, G. Nandi and **S.Sarkar**,**Adv. Sci. Eng. Med.** **2013**, 5, 1181-1186.
26. G.Moula , M. Bose, **S. Sarkar**, **Inorg. Chem.**,**2013**, 52, 5316-5327.
- 27.G. Nandi and **S. Sarkar**, **Euro. J. Inorg. Chem.**,**2013**, 20, 3518-3525.
- 28.M.Bose, G. Moula and **S. Sarkar**, **Chem. Asian J.**,**2013**, 8, 1218-1238.
- 29.J. Mitra and S. Sarkar, **Inorg. Chem.**,**2013**, 6, 3032-3042.
30. P.Dubey, S. K. Sonkar, S.Majumder, K. M.Tripathi and S. Sarkar,**RSC Adv.**,**2013**, 3, 7306-7312.
31. M.Roy,S. K.Meena,S. K.Singh,N. K.Sethy,K.Bhargava,**S. Sarkar**and M.Das,**Mater. Express**, **2013**, 3, 43-50.
32. J. Mitra and **S. Sarkar**, **Dalton Trans.**(Bionorganic chemistry thematic issue, invited article), **2013**, 42, 3050-3058.

#### **Dr. Debabani Ganguly**

1. **D. Ganguly**, W. Zhang and J. Chen, **PLoS Comput. Biol.** 2013, 9, e1003363.
2. H. Huang, **D. Ganguly**, J. Chen and X. S. Sun, **J. Nanosci. Nanotech.** (in press)



***Department of  
Computer Science and Technology  
Department***



## **About the department**

Department of Computer Science and Technology (CST), established in 1982, is the 2nd youngest of the ten Engineering departments in the one and half century old Bengal Engineering College (DU). The CST department, since its inception, has maintained a steady growth in every sphere of its activities and played an important role in bringing a vibrant and forward looking academic environment within the University. It is a premier institution offering high quality undergraduate and postgraduate engineering courses as well as providing an excellent infrastructure and facilities for advanced research and consultancy.

The importance of introducing a separate discipline on Computer Science and Technology was felt back in mid 70s. To serve the growing need of manpower with specialization in Computer Design and Applications a proposal to start the new discipline was submitted to MHRD and the approval was obtained in 1981. The new department started functioning from within the Electrical Engineering department and admitted the first batch of Bachelor of Engineering (BE) students in July 1982 and a separate CST department came into existence in August 1984. In January 1988 Master of Computer Application (MCA) course was introduced; the first in Eastern region. The full time Master of Engineering (ME) course in Computer Science and Technology started from July 1992. The department conferred its first Ph D degree in January 1999.

This department has been accredited by the **National Board of Accreditation (NBA)** as 'A' grade department for 5 years (1999-2004). The department is also acquired **ISO 9000** certification in 1999-2000.

## **Academic Programmes:**

### **Undergraduate Level**

**Degree Offered :** Bachelors of Engineering (BE)

**Sanctioned students' intake :** 60

**Additional intake through lateral entry in 3<sup>rd</sup> Semester :** 6

### **Post Graduate Level**

**Degree offered:** Master of Engineering (M.E.)

**Specialization in :** INFORMATION TECHNOLOGY & ENGINEERING

**Sanctioned students intake:** 16 (GATE)

### **Doctoral & Post Doctoral Research Programme**

**Degree offered :** Ph.D. program in Computer Engineering

**No of candidates enrolled:** 18

**Registered:** 07

**Awarded:** 03

**Faculty Position:****Sanctioned faculty post: 20 Vacant Post: 01**

Faculty profile (in the following table)

| Name                | Designation         | Highest Qualification | Specialisation / Research Area  | Contact No. (Extn. No.) & E-mail Address   |
|---------------------|---------------------|-----------------------|---|--|
| Amit Kr. Das        | Professor           | PhD                   | Image Processing  | (033) 2668 4561 / 2 / 3, Extn. 281<br><a href="mailto:amit@cs.becs.ac.in">amit@cs.becs.ac.in</a>   |
| Uma Bhattacharya    | Professor           | PhD                   | Broadband computing, Fault tolerance, interconnection network   | (033) 2668 4561 / 2 / 3<br>Extn. 575<br><a href="mailto:ub@cs.becs.ac.in">ub@cs.becs.ac.in</a> ;<br><a href="mailto:uma_bh2000@yahoo.co.in">uma_bh2000@yahoo.co.in</a>           |
| Jaya Sil,           | Professor           | PhD                   | Image Processing, Bio-informatics, Pattern Recognition  | (033) 2668 4561 / 2 / 3<br>Extn. 227<br><a href="mailto:js@cs.becs.ac.in">js@cs.becs.ac.in</a>   |
| Susanta Chakraborty | Professor           | PhD                   | Testing Synthesis and placement of Bio-chip, Testing and Synthesis of Quantum Circuit and Nano-Circuit, Low Power Design, Synthesis and Testing of VLSI Circuits. | (+91) 9433503748,<br>Extn. 600/ 602<br><a href="mailto:susanta.chak@gmail.com">susanta.chak@gmail.com</a><br><a href="mailto:sc@cs.becs.ac.in">sc@cs.becs.ac.in</a>              |
| Sipra Das Bit       | Professor & HOD     | PhD                   | Specialization: Computer Sc. & Engg<br>Research Area: Wireless Sensor Network, Mobile Computing   | (033) 2668 4561 / 2 / 3<br>Extn. 600<br><a href="mailto:sb@cs.becs.ac.in">sb@cs.becs.ac.in</a> ,<br><a href="mailto:HOD_CST@yahoo.co.in">HOD_CST@yahoo.co.in</a>                 |
| Biplab Kr. Sikdar   | Professor           | PhD                   | Computer Science and Engg./Cellular Automata  | (033) 2668 4561 / 2 / 3,<br>Extn. 606<br><a href="mailto:biplab@cs.becs.ac.in">biplab@cs.becs.ac.in</a>  |
| Manas Hira          | Associate Professor | M.Tech.               | Temporal Logic & Circuit Verification.  | (033) 2668 4561 / 2 / 3,<br>Extn. 578,<br><a href="mailto:manas@cs.becs.ac.in">manas@cs.becs.ac.in</a> ,<br><a href="mailto:manashira2002@yahoo.com">manashira2002@yahoo.com</a> |
| Somnath Pal         | Associate Professor | M.E.                  | Data Mining & Knowledge Discovery, Chemo informatics  | (033) 2668 4561 / 2 / 3,<br>Extn. 582,<br><a href="mailto:sp@cs.becs.ac.in">sp@cs.becs.ac.in</a>   |
| Sulata Mitra        | Associate Professor | PhD                   | Mobile Computing, Wireless Communication  | (033) 2668 4561 / 2 / 3,<br>Extn. 599,<br><a href="mailto:sulata@cs.becs.ac.in">sulata@cs.becs.ac.in</a>   |
| Abhik Mukherjee     | Associate Professor | PhD                   | Control Systems   | (033) 2668 4561 / 2 / 3,<br>Extn. 596 & 612 (Lab),<br><a href="mailto:abhik@cs.becs.ac.in">abhik@cs.becs.ac.in</a>   |
| Sekhar Mondal       | Associate Professor | PhD                   | Document Image Processing   | (033) 2668 4561 / 2 / 3,<br>Extn. 580,<br><a href="mailto:sekhar@cs.becs.ac.in">sekhar@cs.becs.ac.in</a>   |
| Asit Kr. Das        | Asst. Professor     | PhD                   | Data Mining, Bioinformatics, Pattern Recognition, Social Network  | (033) 2668 4561 / 2 / 3,<br>Extn. 598<br><a href="mailto:akdas@cs.becs.ac.in">akdas@cs.becs.ac.in</a>  |

|                  |                 |         |   |   |
|------------------|-----------------|---------|---|---|
| Apubba Sarkar    | Asst. Professor | M.Tech. | Embedded Computing                                  | (033) 2668 4561 / 2 / 3, Extn.228<br><a href="mailto:sarkar[AT]cs.becs.ac.in">sarkar[AT]cs.becs.ac.in</a> ,<br><a href="mailto:sakarapurba[AT]yahoo.co.in">sakarapurba[AT]yahoo.co.in</a> |
| Saptarshi Ghosh  | Asst. Professor | PhD     | Data Mining, Social Network                         | (033) 2668 4561 / 2 / 3, Extn 595<br><a href="mailto:sghosh@cs.becs.ac.in">sghosh@cs.becs.ac.in</a>   |
| Tamal Pal        | Asst. Professor | M.E.    | Image Processing Wireless Multimedia Sensor Network | (033) 2668 4561 / 2 / 3, Extn 595<br><a href="mailto:tamal@cs.becs.ac.in">tamal@cs.becs.ac.in</a>   |
| Samit Biswas     | Asst. Professor | M.Tech. | Image Processing & Analysis, Data mining            | (033) 2668 4561 / 2 / 3, Extn 595<br><a href="mailto:samit@cs.becs.ac.in">samit@cs.becs.ac.in</a>   |
| Surajeet Ghosh   | Asst. Professor | M.Tech. | Computer Architecture                               | (033) 2668 4561 / 2 / 3, Extn 595<br><a href="mailto:surajeet@cs.becs.ac.in">surajeet@cs.becs.ac.in</a>   |
| Malay Kule       | Asst. Professor | M.Tech. | Tolerance & Testing of Nanoscale circuits           | (033) 2668 4561 / 2 / 3, Extn 595<br><a href="mailto:malay@cs.becs.ac.in">malay@cs.becs.ac.in</a>   |
| Ashish Kr. Layek | Asst. Professor | M.E.    | Image Processing Wireless Telecommunication         | (033) 2668 4561 / 2 / 3, Extn 595<br><a href="mailto:ashish@cs.becs.ac.in">ashish@cs.becs.ac.in</a>   |

#### **Awards and Laurels received by the faculty members :**

|                       |  |
|-----------------------|--|
| Prof. Saptarshi Ghosh | Received the prestigious Humboldt Postdoctoral Fellowship in July 2014. Dr. Ghosh will carry out research under this fellowship at the Max Planck Institute for Software Systems in Saarbrücken, Germany, in the areas of Social Computing and Data Mining.  |
| Surajeet Ghosh        | Received the Best Paper Award of the Track No. 3 for the paper entitled “A Hierarchical High-throughput and Low Power Architecture for Longest Prefix Matching for Packet Forwarding” presented at 2013 IEEE International Conference on Computational Intelligence and Computing Research (ICICR), held 26 <sup>th</sup> –28 <sup>th</sup> December 2013. |

#### **Research area (broad titles only) :**

- i. VLSI Design and Testing for Sub-micron Technology
- ii. Mixed Signal Design and Testing
- iii. Theory and Applications of Cellular Automata in Diverse Fields
- iv. Database Verification / Consistency Checking and Data Mining
- v. Information System for Control and Management Applications
- vi. Mobile Computing
- vii. Testing of Quantum circuit, Reversible Circuit and Nano-Circuit
- viii. Testing and Placement of Bio-Chip
- ix. Broadband Computing
- x. Image Processing including Document Image Processing and CBIR
- xi. Soft computing
- xii. Computational geometry
- xiii. Data mining
- xiv. Wireless network (WSN,DTN)



**Research facilities:****EQUIPMENT**

| SL. No. | Name                                       | Make/Spec   |
|---------|--|---|
| 1       | Function Generator                         | Yokogawa/ FC-300(15MHZ), Synthesized Function Generator   |
| 2       | Digital Signal Oscilloscope(DSO)           | Yokogawa/ DL-9505L 5GS/S 500MHZ   |
| 3       | Labview(Software)                          | National Instrument/ NI-DAQMX for Windows Vista, Vista X64 Edition, XP/2000.Also includes: Labview Signal Express |
| 4       | P/C with Robot Interface                   | Parallax Boe –Bot Robot Kit , Hex- Crawler Kit, Robot Arm   |
| 5       | FPGA                                       | Xilinx Altera   |
| 6       | Microcontroller                            | KEIL  |
| 7       | Cluster and Distributed Computing Platform | IBM,Intel   |
| 8       | Storage and Network                        | IBM   |
| 9       | Wireless Explore Kit(WEK)                  | IEEE 802.15.4 Standard  |

**Name of the laboratories :**

| Software Laboratories  | Hardware Laboratories   |
|--|---|
| <b>Resources:</b> <ul style="list-style-type: none"> <li>• <b>PC'S:</b> 150</li> <li>• <b>Servers:</b> 20</li> <li>• <b>OS :</b> Linux, Windows, Unix</li> <li>• <b>Software:</b> Oracle 9i, matlab, CASE Tool, VLSI etc.</li> </ul> <b>Supporting the following courses:</b> <ul style="list-style-type: none"> <li>i)Data Structure</li> <li>ii)Object Oriented Technology</li> <li>iii)Discrete Structures</li> <li>iv)Operating Systems</li> <li>v)Algorithm</li> <li>vi)Analysis, Design &amp;Management of Information Systems</li> <li>vii) Database Management System</li> <li>vii)Computer Networks</li> <li>viii)Systems Programming</li> <li>ix)Computer Graphics</li> <li>x)Compiler Design</li> <li>xi)Symbolic Logic &amp;Artificial Intelligence</li> <li>xii)Software Engineering</li> <li>xiii) VLSI Design</li> <li>xiv)Electronic Design &amp;Automation</li> </ul> | Digital Circuit Experimentation Kit, Microprocessor S/W Development Kits, Embedded System Design Kits, Programmable Logic Controller, GPS Receiver Unit, RFID Reader.<br><b>Supporting the following courses:</b> <ul style="list-style-type: none"> <li>i)Digital Logic</li> <li>ii)Computer Organization</li> <li>iii)Microprocessor Based System Design</li> <li>iv)Digital Systems Design</li> <li>v)Embedded System</li> <li>vi) Computer Control of Industrial Process</li> </ul> |

**Consultancy Work:** Automation of Assessment and Billing activities of Howrah Municipal Corporation.

**Support staff position:**

(a) Sanctioned technical post.....:- 8

(b) Vacant Post: 1

(ii) Technical staff profile (in the following table)

| Name                | Designation             | Highest Qualification   | Contact No.                  | E- mail  |
|---------------------|-------------------------|---|------------------------------|--|
| BIMAL PRASAD JANA   | SUPDT. TECH. (TEACHING) | LEE   | 2668 4561 / 2 /3<br>Extn 576 | <a href="mailto:bjana@cs.becs.ac.in">bjana@cs.becs.ac.in</a>     |
| SUSANTA CHAKRAVORTY | SUPDT. TECH. (TEACHING) | LEE   | 2668 4561 / 2 /3<br>Extn 611 | <a href="mailto:schak@cs.becs.ac.in">schak@cs.becs.ac.in</a>     |
| PRADIP KUMAR ROY    | TECH.ASST. - I          | LEE   | 2668 4561 / 2 /3<br>Extn 576 | <a href="mailto:pkrr@cs.becs.ac.in">pkrr@cs.becs.ac.in</a>       |
| SUMITRA BAGCHI      | TECH.ASST. - I          | MCA, B. Sc (Physics)  | 2668 4561 / 2 /3<br>Extn 576 | <a href="mailto:bagchi@cs.becs.ac.in">bagchi@cs.becs.ac.in</a>   |
| SARBANI BARARI      | TECH.ASST. - II         | Diploma in Electronics & Telecommunication Engineering, B. Sc | 2668 4561 / 2 /3<br>Extn 576 | <a href="mailto:sarbani@cs.becs.ac.in">sarbani@cs.becs.ac.in</a> |
| SUJATA MISRA        | TECH.ASST. - II         | Diploma in Computer Science & Technology, B. Sc               | 2668 4561 / 2 /3<br>Extn 576 | <a href="mailto:sujata@cs.becs.ac.in">sujata@cs.becs.ac.in</a>   |
| RUMELI BOSE         | TECH.ASST. - II         | M.Tech  | 2668 4561 / 2 /3<br>Extn 612 | <a href="mailto:rumeli@cs.becs.ac.in">rumeli@cs.becs.ac.in</a>   |

**Ongoing Sponsored Research / projects :**

| Name of PI / Co-PIs                      | Title Of the project  | Funding Agency  | Total Quantum support                   | Status     |
|--|---|---|---|------------|
| PI: S. DasBit<br>Co_PIs: Saptarshi Ghosh | “Post-Disaster Situation Analysis and Resource Management Using Delay-Tolerant Peer-to-Peer Wireless Networks (DiSARM)” | Information Technology Research Academy (ITRA), Ministry of Communications and Information Technology, Govt. of India | Amount – 46.29 lakh<br>Duration 3 years | Continuing |
| PI: J. Sil                               | : “Remote Health : A Framework for Healthcare Services using Mobile and Sensor-Cloud Technologies”                      | Information Technology Research Academy (ITRA) – Media Lab Asia   | Amount – 40.11 lakh<br>Duration 3 years | Continuing |

**Industry – Institute Interaction**

Organized seminar jointly with M/S Catalysts on 19.02.2014 for CST and IT students for making them aware about the **Catalysts Coding Contest 2014** and requirement of such type of technological contest.

**Journal**

Ditipriya Sinha, Uma Bhattacharya and Rituparna Chaki, "CLAR:A novel cluster oriented agent based routing protocol for MANET", published in Foundations of Computing and Decision Sciences International Journal Vol. 38, No. 1, 2013. DOI number is [10.2478/v10209-011-0018-5](https://doi.org/10.2478/v10209-011-0018-5).

M.Chatterjee, A.Sharma and U.Bhattacharya, "Fault Tolerant Routing for Minimizing Congestion in WDM Optical Networks Based on de Bruijn Graph", The Mediterranean Journal of Computers and Networks, SoftMotor Ltd., U.K. (accepted for publication,2013).

Santi P. Maity, Seba Maity, Jaya Sil and Claude Delpha, Optimized Spread spectrum watermarking for fading-like collusion attack with improved detection, Special Issue on Wireless Personal Communications Journal, Springer Verlag, vol. 69, no. 4, April (II), 2013.

Santi P. Maity, Seba Maity, Jaya Sil, Claude Delpha, Collusion resilient spread spectrum watermarking in M-band wavelets using GA-fuzzy Hybridization, The Journal of Systems and Software, Elsevier Science Direct, vol. 86, pp47-59, 2013.

Santanu Phadikar, Jaya Sil, Asit Kumar Das, Rice diseases classification using feature selection and rule generation techniques, Computers and Electronics in Agriculture, pp 76-85, vol. 90, 2013.

D. Dutta, P. Dutta and J. Sil, Simultaneous feature selection and clustering with mixed features by multi objective genetic algorithm International Journal of Hybrid Intelligent Systems 11 (2014) 41–54, DOI 10.3233/HIS-130182 IOS Press.

D. Dutta, P. Dutta and J. Sil, Categorical Feature Reduction Using Multi Objective Genetic Algorithm in Cluster Analysis, Transactions on Computational Science XXI, Lecture Notes in Computer Science Volume 8160, 2013, pp 164-189.

Subir Halder and Sipra DasBit, "Design of an Archimedes' Spiral based Node Deployment Scheme Targeting Enhancement of Network Lifetime in Wireless Sensor Networks", Journal of Network and Computer Applications, Elsevier Science (to appear), 2014.

Amrita Ghosal and Sipra DasBit, "A Lightweight Security Scheme for Query Processing in Clustered Wireless Sensor Networks", Journal of Computer and Electrical Engineering, Elsevier Science (to appear), 2014.

Subir Halder and Sipra DasBit, " Design of a Probability Density Function targeting Energy-Efficient Node Deployment in Wireless Sensor Networks" IEEE Transactions on Network and Service Management, Vol 11, No. 2, pp 204-219, 2014.

Subir Halder and Sipra DasBit, "Enhancement of Wireless Sensor Network Lifetime by Deploying Heterogeneous Nodes" Journal of Network and Computer Applications, Elsevier Science, Vol 38, pp 106-124, 2014.

Amrita Ghosal, Sipra Das Bit, "A Jamming Attack Defending Data Forwarding Scheme Based on Channel Surfing in Wireless Sensor Networks", Journal of Security and Communication Networks, Wiley, 6(11), pp 1367-1388, 2013.

S.Mitra and T.Ghosh, "Congestion Control and Revocation of Misbehaving Vehicles in VANET", Journal of Network and Innovative Computing, vol.1, pp. 43-54, 2013, ISSN no. 2160-2174.

S.Mitra, "Bandwidth Allocation for Vehicle Based Nodes in Heterogeneous Wireless Networks", International Journal of Sensors, Wireless Communication and Control, vol.3, no.1, pp.12–24, 2013, ISSN no. 2210-3279.

S. Mitra and A. Mondal, "Joint Congestion Control Strategy During V2V Communication among Authentic Vehicles in VANET", Wireless Personal Communication, Springer US, DOI 10.1007/s11277-014-1840-x, vol.79, issue 1, pp. 43-67, May 2014.

Jagadish Kundu and Abhik Mukherjee; Pricing model for eliminating productivity concerns of outsourced software maintenance service; Int. J. Industrial and Systems Engineering, accepted, 2014.

Samit Biswas, Amit Kumar Das, Bhabatosh Chanda, "Text Segmentation from Bangla Land Map Images" *Journal of Image Processing & Communications* (Accepted).

## Conference

Jana, N.D., Sil, J.; Das, S., "Particle Swarm Optimization with population adaptation," *Evolutionary Computation (CEC), 2014 IEEE Congress on*, vol., no., pp.573-578, 6-11 July 2014.

□ Suparna Biswas and Jaya Sil, Gender Recognition Using Fusion of Spatial and Temporal Features, *Springer Lecture Notes*, Volume 27, pp 109-116, June 2014.

□ Amit Paul and Jaya Sil, Dimension Reduction of Gene Expression Data for Designing Optimized Rule Base Classifier, *Recent Advances in Information Technology (RAIT-2014)*, Springer, India, pp. 133-140, 2014.

□ Zenefa Rahaman and Jaya Sil, DE Based Q-learning Algorithm to Improve Speed of Convergence In Large Search Space Applications, *Proceedings of International Conference on Electronic Systems, Signal Processing and Computing Technologies*, pp 408-412, 2014.

□ Amit Paul and Jaya Sil, Gene Selection for Classifying Patients using Fuzzy Importance Factor", *IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, IEEE, 10.1109/FUZZ-IEEE.2013.6622383, India, 2013, pp.1-7.

□ Suparna Biswas and Jaya Sil, Gender Classification using Spatial and Temporal Features, *Proceedings of IEEE Recent Advances in Intelligent Computational Systems (RAICS)*, 978-1-4799-2178-2/13/\$31.00 ©2013 IEEE, pp 153-157, 2013.

□ Pratyay Konar, Moumita Saha, Dr. Jaya Sil, Dr. Paramita Chattopadhyay, Fault Diagnosis of Induction Motor Using CWT and Rough-Set Theory, *2013 IEEE Symposium on Computational Intelligence in Control and Automation (CICA)*, pp 9-15, 2013.

□ Nanda Dulal Jana and Jaya Sil, Particle Swarm Optimization with Levy Flight and Adaptive Polynomial Mutation in gbest Particle, In *2nd International Symposium on Intelligent Informatics (ISI'13) Mysore*, August 2013.

□ Nanda Dulal Jana and Jaya Sil, Particle Swarm Optimization with Exploratory Move, (PReMI'13), *Proceedings. Springer 2013 Lecture Notes in Computer Science* ISBN 978-3-642-45061-7, Kolkata, December 2013, pp. 614-621.

□ Nanda Dulal Jana, Aditya Narayan Hati, Rajkumar Darbar and Jaya Sil, Real Parameter Optimization using Levy Distributed Differential Evolution, (PReMI'13), **Proceedings. Springer 2013 Lecture Notes in Computer Science** ISBN 978-3-642-45061-7, pp. 605-613 Kolkata, December 2013.

□ and Jaya Sil, Hybrid Particle Swarm Optimization Technique for Protein Structure Prediction Using 2D Off-Lattice Model: Swarm, Evolutionary, and Memetic Computing Lecture Notes in Computer Science Volume 8298, 2013, pp 193-204.

- D. Dutta, P. Dutta and J. Sil Feature Weighted Clustering of Mixed Numeric and Categorical datasets by Hybrid Evolutionary Algorithm, 2013 IEEE INDICON held in Victor Menezes Convention Centre, Indian Institute of Technology (IIT) Bombay, Mumbai, India from 13-15 December, 2013.
- D. Dutta, P. Dutta and J. Sil, Simultaneous continuous feature selection and K clustering by multi objective genetic algorithm, in: *Proceeding of 3rd IEEE International Advance Computing Conference* (2013), 937–942.
- Monidipa Das and Jaya Sil, Query Selection using Fuzzy Measures to Diagnose Diseases, B K Kaushik and Vinu V Das (Eds.): AIM 2013, LNCS pp. 19\_30, 2013. © Communications in Computer and Information Science 2013.
- D. Banerjee and S. DasBit, □ *Reviving Communication in Post Disaster Scenario Using ZIGBEE/GSM Heterogeneous Network* □ , ICACCI, IEEE Xplore, pp 2067-2073, 2014.
- A. Roy Chowdhury, T. Chatterjee, S. DasBit, □ *LOCHA: A Light-Weight One-way Cryptographic Hash Algorithm for Wireless Sensor Network* □ , ANT, Procedia Computer Science vol. 32 pp 497-504, 2014.
- R.Banerjee, M.Mobashir, S. DasBit, □ *Partial DCTbased Energy Efficient Compression Algorithm for Wireless Multimedia Sensor Network* □ IEEE CONECCT, IEEE Xplore 1569825875, pp 1-6, 2014.
- I. Dutta, R. Banerjee S. DasBit, □ *Energy Efficient Audio Compression Scheme Based on Red Black Wavelet Lifting for Wireless Multimedia Sensor Network* □ □ Int. Conf. on Advances in Computing, Communications and Informatics (ICACCI), IEEE Xplore, pp 1070-1075, 2013.
- A. Ghosal, Aadirupa Saha, S. DasBit □ *Energy Saving Replay Attack Prevention in Clustered Wireless Sensor Networks* □ , Pacific Asia Workshop on Intelligence and Security Informatics, LNCS, vol 8039, pp 82-96, 2013.
- S. Mitra, *\_Secure Vehicular Communication \_ A Database Approach\_*, International Conference on Computing and Systems (ICCS), pp.112-117, 2013.
- S.Mitra, “Dynamic Resource Reservation for Authentic Vehicles in VANET”, International Conference on Innovations in Engineering and Technology (ICIET), Section–I, pp.25-29, 2013.
- S.Mitra, “Authentication and Revocation of Vehicles using VIN in VANET”, International Conference on Advance Trends in Engineering and Technology (ICATET), pp. 133 – 139, 2013.
- S.Mitra, “Channel Congestion Control during Secure V2V Communication in VANET”, International Conference on Advance Trends in Engineering and Technology (ICATET), pp. 115 – 120, 2013.
- S.Mitra and A.Mondal, “VIN Based Vehicle Authentication in VANET”, International Conference on Computing, Communication and Sensor Network (CCSN), pp. 191 – 197, 2013.
- A. Mondal and S. Mitra, *\_Dynamic and Distributed Channel Congestion Control Strategy in VANET\_*, IEEE International Conference on Advances in Computing, Communications and Informatics (ICACCI), pp. 1697-1703, 2014.

S. S. Ray, S. Ghosh, R. Prasad, “Low-Cost Hierarchical Memory-Based Pipelined Architecture for DNA Sequence Matching”, The 11<sup>th</sup> IEEE India Conference INDICON 2014, 11th-13th Dec. 2014. (Accepted)

S. S. Ray, A. Bhattacharya, S. Ghosh, “A Fast Range Matching Architecture with Unit Storage Expansion Ratio and High Memory Utilization using SBiCAM for Packet Classification”, The 11<sup>th</sup> IEEE India Conference INDICON 2014, 11th-13th Dec. 2014. (Accepted)

S. S. Ray, A. Chatterjee, S. Ghosh, “A Novel Approach for Prefix Minimization using Ternary Trie (PMTT) for Packet Classification”, IEEE TENCON 2014, 22nd-25th Oct. 2014. (Accepted)

S. Ghosh, S. S. Ray, S. Mandal, “High Through-put Scalable Query Processing Architecture using STCAM”, Proc. of IEEE International Conference on Computational Intelligence and Computing Research, (Available in IEEE Xplore Digital Library), pp. 650-653, 26th-28th Dec. 2013.

Samit Biswas, Amit Kumar Das, “Text Segmentation from Land Map Images”, In Pattern Recognition and Machine Intelligence, volume 8251 of Lecture Notes in Computer Science (LNCS), pages 521-529. Springer Berlin Heidelberg, 2013.

Samit Biswas, Sekhar Mandal, Amit Kumar Das, Bhabatosh Chanda “Land Map Images Binarization Based on Distance Transform and Adaptive hreshold”, *11th IAPR International Workshop on Document Analysis Systems (DAS)*, vol., no., pp.334-338, 7-10 April 2014.

Sayan Mandal, Samit Biswas, Amit Kumar Das, Bhabatosh Chanda, “Binarisation of Colour Map Images through Extraction of Regions”, Computer Vision and Graphics, volume 8671 of Lecture Notes in Computer Science (LNCS), pages 418-427. Springer Berlin Heidelberg, 2014

## **Books / Monographs**

“Ditipriya Sinha, Uma Bhattacharya, Rituparna Chaki , A Novel Secure Routing Protocol in Manet”: One chapter is contributed in the book “Advancements in Distributed Computing and Internet Technologies: Trends”, in IGI Global (formerly Idea Group Inc.), 2013 USA.

S. Mitra, “Seamless Mobility Management – A Need for Next Generation All-IP Wireless Networks”, Chapter-19 of the book “Security, Privacy, Trust, and Resource Management in Mobile and Wireless Communications”, IGI-Global: 701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA, pp. 463-489, 2013, DOI: 10.4018/978-1-4666-4691-9.ch019.

## **Seminar / Workshops / Conferences / Training programme organized by the department (2013 - 14)**

- One-day seminar coordinated by Dr. Abhik Mukherjee on Some Aspects of Mathematics in Computer Science was organized by the Department on 10<sup>th</sup> April, 2013.
- One-day seminar coordinated by Dr. Abhik Mukherjee on Some Aspects of Mathematics in Computer Science was organized by the Department on April, 2014.
- A short term TEQIP-II sponsored course coordinated by Dr. Saptarshi Ghosh and Dr. Asit Kumar Das on Social Media Analysis and Data Mining was organized by the Department during June 10-14, 2013.

- Workshop on Nanotechnology & Biochip (1-3 July 2014) organized by dept of Computer Science and Technology (coordinated by Prof. Susanta Chakraborty, Dr. Sulata Mitra and Malay Kuley).

### **Advancements under TEQIP – Phase II**

Seven faculty members attended International Conferences/ visited Universities in abroad under faculty development scheme of TEQIP-II.

- **Foreign visits and Invited Lectures**
- Dr. S. Mitra attended Bangkok International Conference on Innovations in Engineering and Technology, December 2013.
- S. Das Bit attended and chaired a session in Int. Conference on Ambient Systems, Networks and Technologies (ANT 2014), Belgium, 2<sup>nd</sup> – 5<sup>th</sup> June, 2014.
- Dr. J. Sil visited Polish Japanese Institute of Technology, Warsaw, Poland.
- S. Ghosh attended Bangkok International Conference on Computer Vision and Graphics (ICCVG 2014) International Conference on Computer Vision and Graphics (ICCVG 2014) Bangkok, Thailand IEEE TENCON 2014, 2nd-25th October 2014
- Dr. U. Bhattacharya visited School of Computer Science, Windsor University, Canada in July 2014 to collaborate with Prof. Subir Bandyopadhyay of the department and give an invited lecture to the students and scholars of the department.
- S. Biswas attended International Conference on Computer Vision and Graphics (ICCVG 2014) at Polish Japanese Institute of Technology, Warsaw, Poland.
- **Visitors to your Department ( Indian & Foreign)**
- Dr. Tyll Krueger, Wroclaw University of Technology, Poland visited the dept and delivered a speech on “Stochastic models of cancer evolution” on March 3, 2014.
- Dr. Angshul Majumdar, IIIT, Delhi visited the dept and delivered a speech on “Collaborative Filtering in Recommender Systems” on March 19, 2014.
- Dr. Sushmita Ruj, ISI, Kolkata visited the dept and delivered a speech on “Some Mathematical Tricks to Secure Wireless Sensor Networks” on March 26, 2014.

- **Alumni Contribution to your Department**

Two of the alumni from Industry actively participated in course curriculum development as external members of BOS.

- **Training and Placement**

During 2013-14, 87% of final year students were placed through campus placement.

- **New Academic / Research Initiatives**
- **Academic Collaboration :**
- Academic collaboration has been done among IEST, Shibpur, IIT Kgp, IIMC, NITD, KGECE, HIT through a sanctioned collaborative project on Disaster Mgt funded by ITRA, GOI. The mentors are from renowned Institutes of USA
- Academic collaboration has been done among IEST, Shibpur, JU, CU, NITD, KIIT, and FGIET through a sanctioned collaborative project on Remote Health funded by ITRA, GOI. The collaborators also include TCS and Doctors. The mentors are from renowned Institutes of USA.

***Department of  
Electrical Engineering***





## About the Department:

The Department of Electrical Engineering is one of the oldest in this ‘ancient-new’ University. Started in 1912, undergraduate degree course was introduced in this department from 1935-36 and postgraduate course from 1955. The first Ph.D. was produced by this department in 1959. The number of Ph.Ds awarded from this department has now been grown to 27 out of which 22 had been in last 10 years. From 1989, the Ministry of Human Resource Development declared this department as one of the QIP Centres for Post Graduate Studies and Research.

The faculty and other staff members of the department are committed to imparting excellent education at par with national / international seats of learning. An extraordinary pool of talents exists in fields as diverse as Electrical Machines, Power Systems, Control Systems, Power Electronics and Instrumentation. Research activities in the department are on a climbing ramp. The department has been included in the ‘National Mission on Power Electronics Technology’ (NaMPET), a project launched by DIT, MCIT, Govt. of India. In this programme, it shares the limelight with three IITs, IISc. and Anna University. Under NaMPET the department has received a grant of approximately Rs. 2 crores to spearhead research on Power Electronics. The department was chosen to carry out research under the SAP-DRS scheme of UGC in the area of smart control and instrumentation systems at a total project cost of almost Rs. 52 lakhs. The department has also executed the DST-FIST project under which a grant of Rs. 1.5 crores had been received. It has also received its share of about Rs.1.2 crores under the TEQIP scheme. Other research activities include condition monitoring of electrical equipment (a MOU with TISCO has been signed), application of soft computing tools to electrical machine and power system related problems, design of robust controllers for defense applications, biomedical instrumentation, power quality studies, embedded technology etc.

## Academic Programmes:

### a. Undergraduate level (NBA accreditation for 3 years)

- i. Degree offered – **B. E. (Electrical Engineering)**
- ii. Sanctioned students’ intake – **60**
- iii. Additional intake through lateral entry in 3<sup>rd</sup> semester - **6**

### b. Postgraduate level (NBA accreditation for 5 years)

- i. Degree offered – **M. E. (Electrical Engineering)**
- ii. Sanctioned students’ intake – **24**
- iii. Additional intake through other programs – **2 (QIP)**
- iv. Specialisations in -  
**(a) Control Systems**  
**(b) Electrical Machines**  
**(c) Power Electronics**  
**(d) Power Systems**

### c. Doctoral level

- i. Degree offered – **Ph. D. Engg.**
- ii. No. of candidates enrolled – **8**
- iii. No. of candidates registered – **4**
- iv. No. of candidates awarded – **1**

## Faculty positions :

Sanctioned faculty post – **28:** Vacant post – **2** (One adjunct Professor should not be counted, sr. no 1)

### Faculty profile:

| Sr.No. | Name                     | Designation       | Highest Qualification | Specialisation / Research Area                        | Contact no.  | E-mail id                   |
|--------|--------------------------|-------------------|-----------------------|---|--------------|-----------------------------|
| 1.     | S. Mallik                | Adjunct Professor | M.E.E.                | Electrical Machines                                   | 94331 68523  | srikumar_mallik@hotmail.com |
| 2.     | B. Basak                 | Professor & Head  | Ph.D.                 | Electrical Machines, Power Electronics & Drives       | 94331 39874  | biswarup_basak@yahoo.com    |
| 3.     | A. Chakrabarti           | Professor         | Ph. D.                | Power Systems, Networks                               | 98302 02924  | a_chakraborti55@yahoo.com   |
| 4.     | D. Sarkar                | Professor & Head  | Ph. D.                | Electrical Machines, Electromagnetic Fields           | 94332 41826  | debasissrkr@yahoo.co.in     |
| 5.     | G. Bandyopadhyay         | Professor         | Ph. D.                | Power Systems, Computer Applications                  | 94338 19668  | gautamkabi@hotmail.com      |
| 6.     | J. Pal                   | Professor         | Ph. D.                | Power Systems, Computer Applications & Expert Systems | 94331 83992  | jagadish_pal@hotmail.com    |
| 7.     | A. Sutradhar             | Professor         | Ph. D.                | Instrumentation, Digital systems                      | 94771 23351  | aseel@rediffmail.com        |
| 8.     | P. Syam                  | Professor         | Ph. D.                | Solid state   | 98368 93676  | prasidsyam@yahoo.co.uk      |
| 9.     | A.K. Maitra (reemployed) | Professor         | Ph. D.                | Power Systems, Power System Protection                | 94770 02145  | ashokmaitra@gmail.com       |
| 10.    | C.K. Chanda              | Professor         | Ph. D.                | Power System, Electrical Machines                     | 94332 69567  | ckc_math@yahoo.com          |
| 11.    | A. Rouf                  | Professor         | M.Tech.               | Electrical Machines, Non-Conventional Energy          | 94330 98388  | rauf_a@hotmail.com          |
| 12.    | M. Sengupta              | Professor         | Ph. D.                | Electromagnetic Fields, Machines and Drives           | 033 26685869 | mainak.sengupta@gmail.com   |
| 13.    | D. Roy                   | Professor         | Ph. D.                | Electrical Machines & Drives                          | 98364 84873  | dbr_roy@yahoo.co.in         |
| 14.    | Aparajita Sengupta       | Professor         | Ph. D.                | Control Systems                                       | 98747 47610  | aparajitasg@rediffmail.com  |
| 15.    | K.Das(Bhattacharya)      | Professor         | Ph. D.                | Microprocessor & Power System                         | 93393 00765  | poopoolee50@hotmail.com     |

|     |                   |                  |        |  |             |  |
|-----|-------------------|------------------|--------|--|-------------|--|
|     |                   |                  |        | Protection   |             |  |
| 16. | D. Ganguly        | Asso. Professor  | M.E.E. | Power Electronics & Drives, Microprocessor Applications                              | 98303 06490 | ganguly.debjani@gmail.com  |
| 17. | A. Barman         | Asso. Professor  | M.E.E. | Digital Computers  | 94324 93108 | amalburman@yahoo.com   |
| 18. | A.B. Choudhury    | Asso. Professor  | M.E.E  | Power Systems  | 94331 69967 | ab_choudhury@yahoo.com   |
| 19. | Anindita Sengupta | Asso. Professor  | Ph. D. | Instrumentation , Control Systems  | 94320 83954 | aninsen2002@yahoo.com  |
| 20. | A. De             | Asstt. Professor | Ph. D. | High Voltage Engg., Power Systems  | 94332 69572 | abhinandan.de@gmail.com  |
| 21. | K. Mukherjee      | Asstt. Professor | Ph. D. | Power Electronics / Electrical Machine Drives, Distributed Generation, Power Quality | 98746 93920 | <a href="mailto:kaushikk_mukh@rediffmail.com">kaushikk_mukh@rediffmail.com</a> , |
| 24. | P. Chattopadhyay  | Asstt. Professor | Ph. D. | Power System, Microprocessor , Pondition Monitoring                                  | 92316 64811 | paramita_chattopadhyay@yahoo.com   |
| 25. | S. Parui          | Asstt. Professor | Ph. D. | Electrical Machines & Drives, Power Systems  | 94332 51764 | sp_74107@yahoo.com   |
| 26. | Bhaskaran Barman  | Asstt. Professor | Ph. D. | Power Electronics & Machine Drives   | 94345 28673 | Barman_bec@rediffmail.com  |
| 27. | S. Dalapati       | Asstt. Professor | Ph. D. | Power Electronics & Machine Drives   | 94349 58817 | suvarundalapati@yahoo.co.in  |

## Awards and Laurels:

1. Dr.Kaushik Mukherjee : Was offered and availed of 'Visiting Professor' assignment, related to R&D activities, in the Centre of Hybrid and Automotive Research and Green Energy (CHARGE), University of Windsor, Canada during June - July 2014. Ms. Xiaomin Lu, doctoral candidate in Centre for Hybrid Automotive Research and Green Energy, University of Windsor visited BESU, Shibpur, EE Dept. and performed research with Kaushik Mukherjee for one and half months (December 2013-January 2014). She has received her PhD degree eventually in October 2014 with Dr. Narayan Kar, Associate Professor, University of Windsor, Canada as her supervisor and Dr. Kaushik Mukherjee as her co-guide. Mr. K. L. V. Iyer, another doctoral candidate at Centre for Hybrid Automotive Research and Green Energy, University of Windsor is currently visiting IIST Shibpur, EE Dept. (December 2014 – February 2015) to perform collaborative research with Dr. Kaushik Mukherjee.
2. Prime Minister's Fellowship (CII-DST) was won by Mr. S. K. Nanda, a Ph. D. scholar under Prof. M. Sengupta
3. Tata Rao Award for Best Paper in Institution of Engineers (I) by Prof. C. K. Chanda
4. Best Paper award in the Second Michael Faraday IET India Summit by Prof. Anindita Sengupta

## Research Area

1. **Power Electronics**
2. **Application of Advanced Signal Processing and Soft-computing Techniques in Condition Monitoring of Induction Motor.**
3. **Smart Energy Saving Device for Power Factor Control.**
4. **Identification of Physiological Processes and Analysis, Synthesis and Design of Controllers for Drug Delivery System.**
5. Robust Control applications in aerospace and ballistic problems
6. **Stability, Economic and Optimum Operation and Control of EHV Power Transmission System**
7. Robust Control and Nonlinear control
8. Theory and Instrumentation (Specially Analytical Instrumentation)

## Research Facilities:

### ► **Electrical Machine Laboratory**

#### Synthetic Rotating Machines comprising of:

1. 1ph. Sq. cage Ind. Motor (Capacitor Start Induction Run) Model: BEC/0.75/01/04.
2. 1ph. Sq. cage Ind. Motor (Capacitor Start/Run) Model: BEC/1.5/01/04
3. 1ph. Sq. cage Ind. Motor (Resistor Split type) Model: BEC/0.5/01/04
4. 3ph. Slip Ring Ind. motor Model: BEC/5.6/02/04
5. 3ph. Sq. cage Ind. motor Model: BEC/5.6/01/04
6. DC compound motor Model: BEC/5.6/DC1/04
7. Permanent Magnet DC motor Model: BEC/1.5/PMDC1



3ph. Sq. cage Ind. motor



3ph. Slip Ring Ind. Motor



1ph. Sq. cage Ind. Motor  
(Resistor Split type)



1ph. Sq. cage Ind. Motor  
(Capacitor Start /Run)



1ph. Sq. cage Ind. Motor  
(Cap Start /Induction Run)



DC compound motor



Permanent Magnet  
DC motor

### ► High Voltage Laboratory



AC High Voltage Test Set



DC High Voltage Test Set



Test Set for measuring Tanδ & BDV



Lightning Impulse Test Set



Insulation cum Polarization  
Index Test Set

### ► Energy Laboratory:

1. Automatic Dry Cell Battery Testing Setup
2. Energy Management System including SCADA



Automatic Dry Cell Battery Testing Setup



Laboratory Model of a SCADA

► **Condition Monitoring Laboratory:**

- a) A full set of Machinery Fault Simulator, Spectra Quest, USA, fitted with vibration and current sensors (AICTE)
- b) High speed Data Acquisition System (DAS) ( Hardware and Software) (AICTE/ DST)
- c) Adequate computing and printing facilities along with good working atmosphere ( DST/ AICTE)
- d) Multi user ANSYS software. (DST)



Existing Condition Monitoring Laboratory in EE Dept.

► **Calibration Laboratory**

This laboratory has been set up with the help of DST FIST support to build an infrastructure for regular experiments of the curriculum, research works and calibration of instruments. A full set up of calibration equipment has been procured by which all single phase meters and watt-meters excluding energy meters can be calibrated in house, which is being done at present. We also have single phase and three energy meter calibration units. Presently laboratory experiments are performed and PG research activities are on. Some training courses have been offered and the laboratory facilities had been extended to the engineers and technicians from industries like M/S Stuarts and Lloyds (Refresher course). One PG project work has been carried out in this laboratory on “Calibration of Temperature sensors...” under the supervision of Dr. D. Ghosh.

**Only one equipment worth Rs. 8-10 lakh producing precision three phase variable voltage source with phantom loading and clock pulses by PC control has to be procured and formalities are to be fulfilled for NABL accreditation of the lab and one or two full time technical assistants are to be appointed so that the infrastructure may be fully utilized for teaching, research as well as commercial purpose.**

The equipments in this Laboratory are:

- a) ISOTECH 650 Plus dry bath with temperature indicator/controller.
- b) Times Electronics 5051: Multifunction Calibrator.
- c) Times Electronics 5077: Power Calibrator with current probe.
- d) Times Electronics 5075: 6½ digit precision multimeter.
- e) Times Electronics Pressure calibrator.
- f) Shenzhen Clou C112: Portable single phase energymeter calibrator
- g) Shenzhen Clou C312: Three phase energymeter calibrator.
- h) Yakogawa DL1620 digital storage oscilloscope.
- i) Pentium IV PC with core 2 duo processor and 1GB RAM.



- j) EASYCAL calibration and report generation software.
- k) MATLAB 7.3 Release 2008b licensed software.

The pictures of the equipments in the laboratory are shown below:



Single Phase Power Calibrator



650° Dry Bath



Precision Multimeter



DL1620 Digital Storage Oscilloscope



Pressure Calibrator



Multi-function/Multi-product Calibrator



3-ph Energy Meter calibrator



Single phase Energy Meter Calibrator



► **Advanced Power Electronics Laboratory:**

Equipments procured and utilized:

1. Variable Voltage Static DC source.
2. Isolation Transformer
3. Regulated DC Power Supply similar to model 19 rack adaptable Regulated DC power Supply
4. Regulated DC similar to model Regulated DC power Supply Dual and Triple Output
5. Regulated DC similar to model Regulated DC power Supply Single Output
6. Mixed Signal Oscilloscope with built in printer
7. Mixed Signal Oscilloscope
8. DC Electronic Load (Main Frame and Load Module)
9. Handheld Battery operated Digital Power scope
10. Arbitrary Waveform Function Generator
11. 10 KVA IGBT – UPS
12. DSP Based Motor Control and Power Electronics Training Kit
13. DSP Based Motor Controller Training Kit
14. 10 KVA 3 Phase STATCOM
15. 10 KVA Unified Power Quality controller
16. 10 KW 4 Quadrant Line Regenerative AC Drive
17. FPGA Mother Board
18. FPGA Interface Card



► **Smart Control Laboratory:**

The “Smart Control Laboratory” has Computing Facilities, Networking and LAN connections







► **Energy Laboratory:**

Experimental kits were received from National Center for Photovoltaic Research and Education, IIT Bombay. The following set-ups are used for experiments:

1. Solar Simulator set up.
2. PV Module Characterization kit.

3. PV System Characterization kit.
4. Carrier Lifetime Measurements for a Solar Cell.
5. Solar Based Single Phase 200W AC Generation.

### **Name of the Laboratories:**

1. Electrical Machine Laboratory
2. Power System Laboratory
3. Drives Laboratory
4. Power Electronics Laboratory
5. Process Control and Instrumentation Laboratory
6. Calibration Laboratory
7. Microprocessor Laboratory
8. Circuits & Measurement Laboratory
9. Control System Laboratory
10. Energy Systems Laboratory
11. Simulation Laboratory
12. Industrial Electronics Research Laboratory
13. Relay Laboratory
14. Basic Electrical Engineering Laboratory
15. Condition Monitoring Laboratory
16. Advanced Power Electronics Laboratory
17. High Voltage Laboratory
18. Smart Control Laboratory

### **Consultancy Work:**

| <b>Company</b>                               | <b>Total cost (Rs.)</b> |
|--|-------------------------|
| Haldia Development Authority - 2014          | 10,58,23,470            |
| Digha Sankarpur Development Authority - 2014 | 2,96,44,935             |
| Talgachhaari – 1 Gram Panchayat - 2014       | 7,72,643                |

## Support Staff position:

Technical staff profile:

| Name             | Designation                    | Highest Qualification                               | Contact No.  | e-mail id                     |
|------------------|--------------------------------|---|--------------|-------------------------------|
| B. Dey           | Technical Assistant            | L.E.E.  | 98747 18826  |                               |
| R. Maity         | Technical Assistant (Grade II) | D.E.E   | 94331 04331  | ra_ktim@hotmail.com           |
| R. Bandyopadhyay | Technical Assistant (Grade II) | D.E.E   | 94324 04489  | rajib_nh@sify.com             |
| P. K. Das        | Technical Assistant (Grade II) | D.E.E   | 94 338 43324 | pradipkdaselec@rediffmail.com |
| A. Pal           | Technical Assistant (Grade II) | D.E.E   | 94331 55457  | amit_raju_pal@sify.com        |
| P. S. Baruri     | Technical Assistant (Grade II) | D.E.E   | 91439 17487  | mr.dekacom@rediffmail.com     |
| S. K. Ray        | Mechanic                       | Workman's Permit (Dir. Of Electricity, Govt. of WB) | 94336 02932  | roysamir26@yahoo.in           |
| B. Santra        | Instrument Mechanic            | JDE & NCVT (Govt. of India)                         | 98748 04896  | Bablu_Santra@yahoo.com        |

## Ongoing Sponsored Research / Projects :

| Title  | Project Investigator                            | Sponsoring Agency  | Total Amount (Lakhs of Rupees) |
|--|---|--|--------------------------------|
| National Mission on Power Electronics Technology (NaMPET) : Phase II - Started around middle of 2012                             | M. Sengupta, P. Syam, D. Ganguly & K. Mukherjee | Department of Electronics and Information Technology, Govt. of India | 93                             |
| Spectral Standardization of Potentised Homeopathic Medicines   | C. R. Mahata, A. Sutradhar, P. Syam, D. Ganguly | CCRH   | 26.2                           |
| Study of Non-linear phenomena in Electrical Drives   | S. Parui  | AICTE  | 10.5                           |
| Development of Nano-structured Transformer Oil nano-fluids for Improvement of Thermal and Insulating Properties                  | P. B. Chattopadhyay                             | CPRI, Dept' of Power GoI   | 86                             |
| Development of a sensor integrated multi-fingered dexterous robot hand with data glove interface                                 | D. Ganguly (Co-Investigator)                    | DAE/ BARC  | 61                             |
| Development of an efficient staple yarn characterization unit with multi- sensor fusion and field programmable gate array (FPGA) | Anindita Sengupta                               | DST-IDP  | 31.094                         |

|   |                                      |                              |        |
|---|--------------------------------------|------------------------------|--------|
| based data reduction card.<br>(17/08/2011)  |                                      |                              |        |
| Embedded Systems in Instrumentation and Control (2011-2016)   | Aparajita Sengupta                   | UGC-SAP DRSI                 | 51.25  |
| Analysis and Development of a single-axis controlled repulsive type magnetic bearing (from 16/01/2013 for 3 years)  | D. Roy & A.B. Choudhury              | DST-SERB                     | 38.498 |
| Design and development of computerized instrument for testing bending behavior of semi-rigid fabric with special reference to technical textiles (30/01/2012) | Anindita Sengupta                    | DST-IDP                      | 30.086 |
| Analytical and Experimental Investigations on Control of State-of-The-Art Induction Heating Units   | M. Sengupta, B. Barman               | DST                          | 36.05  |
| Smart microgrid   | K.Das Bhattacharya (Co-Investigator) | WBREDA, Dept. of Power, GoWB | 55.0   |

## Details of publications:

**Journal – 11**

**Conference – 22**

**Books / Monographs**

### List of Publications (last 1 year):

#### Journals

1. J.K.Moharana, M.Sengupta and A.Sengupta, “Design and Implementation of a PI-Controller on a 10kVA STATCOM prototype”, International Journal of Power and Energy Conversion, Inderscience 2014.
2. Nanda S.K., Sengupta M. and Sengupta A., “Modelling, Simulation, Fabrication, Experiments and Real-Time Linear State Variable Feedback Control of Cuk Converter using Pole Placement Technique”, accepted for JOURNAL OF THE INSTITUTION OF ENGINEERS (INDIA): SERIES B, Vol. 95, No. 2, May.2014
3. P. Konar, Dr. P. Chattopadhyay, “Multi-Class Fault Diagnosis of Induction Motor Using Hilbert and Wavelet Transform”, Applied Soft Computing, 2014, REF No.: ASOC-D-14-00116 ( In press, January 2015)
4. P. Konar, Dr. P. Chattopadhyay, “Feature Extraction Using Wavelet Transform For Multi-Class Fault Detection of Induction Motor”, Journal of the Institution of Engineers (India): Series B, vol. 95. No. 1, 2014, pp 73-81
5. P. Konar, P. Chattopadhyay, “Knowledge Extraction using Data Mining for Multi-Class Fault Diagnosis of Induction Motor”, Neurocomputing, MS No. NEUCOM-D-14-01746 (Under Revision)
6. Anindita Sengupta, Subhasish Roy, Surajit Sengupta,” Development of a low cost yarn parameterization unit by Image Processing”, Elsevier Journal of Measurement, vol. 59, pp.96-109,2014.

7. Partha Kayal, C.K. Chanda, "Optimal Mix of Solar and Wind Distributed Generations considering performance improvement of electrical distribution network". Elsevier: Renewable Energy.
8. Tapan Kumar Chattopadhyay, Sumit Banerjee, Chandan Kumar Chanda, "Simple Approach on Voltage Stability Index of Distribution Systems for Loads of Different types", International Review of Electrical Engineering (IREE), Vol 9, No 5 (2014)
9. Partha Kayal, C.K. Chanda, "A Multiobjective Approach to integrate solar and wind energy sources with electrical distribution network", Elsevier : Solar Energy (Accepted)
10. K. Bhattacharya, "On the Role of Supercapacitors towards Characterization of PV Generators", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.3, Issue 8, August 2014.
11. Xiaomin Lu, K.L.V. Iyer, **Kaushik Mukherjee**, K. Ramkumar and N. C. Kar, "Investigation of Permanent Magnet Motor Drives Incorporating Damper Bars for Electrified Vehicles", accepted for publication in **IEEE Transactions on Industrial Electronics** in September 2014.

#### Conference Proceedings

1. B. Barman, M. Sengupta, "Design, fabrication, simulation and testing of repulsion type levitation prototype", IEEE-PEDES 2014, Dec. 2014, IIT Bombay.
2. B. Barman, M. Sengupta, "Design, fabrication, simulation and testing of a Phase modulated resonant transition converter", IEEE-PEDES 2014, Dec. 2014, IIT Bombay.
3. S.Parui and B. Basak, Effects of Input Voltage Ripple in the Bifurcation of Current Mode Controlled DC Drive, International Conference on Control, Instrumentation, Energy and Communication (CIEC 2014), January 31-February 2, 2014, University of Calcutta, published in CD-ROM
4. S.Parui and B. Basak, Evolution of New Types of Borderline Trajectories in State Space in Current Mode Controlled DC-DC Converter due to Switching Delay, International Conference on Control, Instrumentation, Energy and Communication (CIEC 2014), January 31-February 2, 2014, University of Calcutta, published in CD-ROM
5. P. S. Panigrahy, P.Konar, P.Chattopadhyay, "Broken Bar Fault Detection using Fused DWT-FFT in FPGA Platform", International Conference on Power, Control and Embedded Systems (ICPCES-2014), December 28-29, 2014.
6. S. Mitra, P. Chattopadhyay, "Challenges in Implementation of ANN in Embedded System", International Doctoral Symposium on Applied Computation and Security Systems (ACSS-2015), May 23-25, 2015. (Communicated)
7. P. S. Panigrahy, S.Mitra, P.Chattopadhyay, "FPGA Based Broken Bar Fault Detection of Induction Motor Using Vibration Signal Analysis" International Doctoral Symposium on Applied Computation and Security Systems (ACSS-2015), May 23-25, 2015. (Communicated)



8. S. Mondal, P. Chattopadhyay, "Fuzzy Vs. Neuro-fuzzy: Implementation on the Reconfigurable FPGA System", International Conference on Energy, Power and Environment (ICEPE 2015), 12-13th June 2015 (Communicated)
9. Anindita Sengupta, Arunima Mukherjee, Rimi Paul, Ananya Roy, Application of MRPID controller on Liquid level system: A performance study, Proceeding of IEEE international conference on Control, Instrumentation, Energy and Communication(CIEC-14), 31 January-2 February, India, 2014.
10. Ujjwal Mondal, Anindita Sengupta, Rajeev Ranjan Pathak, DWT based Repetitive controller for tracking of periodic reference signal, Proceeding of IEEE international conference on Control, Instrumentation, Energy and Communication(CIEC-14), 31 January-2 February, India, 2014.
11. Subhasish Roy, Anindita Sengupta, Surajit Sengupta "Yarn Hairiness Evaluation Using Image Processing" in the Proceeding of IEEE international conference on Control, Instrumentation, Energy and Communication(CIEC-14), 31 January-2 February, India, 2014.
12. Chattopadhyay, T.K. ; Banerjee, S. ; Chanda, C.K., "Voltage stability analysis of distribution networks under critical loading conditions", Power and Energy Systems Conference: Towards Sustainable Energy, 2014
13. Chattopadhyay, T.K. ; Banerjee, S. ; Chanda, C.K., "Impact of shunt capacitor on voltage stability analysis of distribution networks under critical loading conditions", First International Conference on Automation, Control, Energy and Systems (ACES), 2014.
14. Saha, S.K. ; Banerjee, S. ; Chanda, C.K., "Status of all branches of distribution networks in chronological order using distributed generation at optimal position", 1st International Conference on Non Conventional Energy (ICONCE), 2014.
15. Chattopadhyay, T.K. ; Banerjee, S. ; Chanda, C.K., "Impact of distributed generator on voltage stability analysis of distribution networks under critical loading conditions", First International Conference on Automation, Control, Energy and Systems (ACES), 2014.
16. Chattopadhyay, T.K. ; Banerjee, S. ; Chanda, C.K., "Impact of distributed generator on voltage stability analysis of distribution networks under critical loading conditions for composite loads", International Conference on Electronics, Communication and Instrumentation (ICECI), 2014.
17. Kayal, Partha ; Khan, Chandra Mohan ; Chanda, Chandan Kumar, "Selection of distributed generation for distribution network: A study in multi-criteria framework", International Conference on Control, Instrumentation, Energy and Communication (CIEC), 2014.
18. Krishna Chandra Meher; C.K. Chanda, "Modified GSO for Combined Economic Emission Load Dispatch with Valve Point Effect", International Conference on Advances in Electronics, Computers and Communications 2014 (ICAEECC) in Reva University on 10.10.2014.

19. K. Bhattacharya et al, “Application of Phasor Measurement Unit in Adaptive Protection for Loss of Excitation in a Generator”, 6th IEEE POWER INDIA International Conference, 5<sup>th</sup>-7<sup>th</sup> Dec, 2014.
20. K. Bhattacharya et al,” Design & Implementation of MPPT Algorithm for Battery Charging with Photovoltaic Panel Using FPGA”, 6th IEEE POWER INDIA International Conference, 5<sup>th</sup>-7<sup>th</sup> Dec, 2014.
21. K. Bhattacharya et al, “A simple on-line method of characterizing PV Cells/Modules using Supercapacitor”, The 6<sup>th</sup> World Conference on Photovoltaic Energy Conversion, (WCPEC-6), Nov 23-27, 2014.
22. A. Datta, **D. Ganguly**, T. Patra, S. Akhuli, “Experimental results on low cost microcontroller based DC drive implementation”, Second International Conference on Electrical Energy Systems (ICEES -2014), SSN College of Engineering, Kalavakkam, India, 7-9 January, 2014.

### **Seminars / Workshops / Conferences / Training programs organized:**

- (i) Short term Course on Power Electronics in June, 2014
- (ii) National seminar on ‘Embedded Systems in Instrumentation and Control’ (ESIC 2014) in March 2014

### **Innovation and Technology Developed:**

**A.** Having done the developments of research on **Power Electronics** with generous and continued support from the NaMPET Project, the Power Electronics group at EE, BESU, Shibpur has already started reaping benefits through a much improved course curriculum in PE at both UG and PG level. It has also gained reasonable visibility. However to justify the infrastructure created the next essential step is first to procure funded research projects and doctoral manpower and to produce time-bound results in those projects through the recruited manpower.

The major achievements in the field of Power Electronics are

1. Design and fabrication of the power electronic converter for a double sided axial flux SR motor for an electric bicycle,
2. Experimental determination of Parameters of a wound – Field Three Phase Synchronous Motor and Modeling and Simulation of its Performance under Self – Control,
3. Development of a complete commutatorless DC motor drive,
4. Three Phase To Three Phase Matrix Converters performance simulation with inductive load, design and fabrication of sensing and interface cards and implementation of current commutation on FPGA platform,
5. Application of a TMS320LF2407A platform in implementing space Vector Modulation based control of a Matrix Converter,

6. 1 kW, 48V, 2000rpm, 4-pole BLDC Motor for EV application,
  7. 1 kW, 48 V, 3000 RPM, 3 phase Switched Reluctance Motor for electric vehicle application -Weight optimized design, fabrication, controller design, system modeling, performance simulation and open loop running,
  8. Finite element based design, fabrication and Testing of a 2kW, 20 A, 10 kHz CSI-fed single Phase Induction Heating Furnace for Application in bar/billet heating,
  9. Investigations on a CSI fed induction heating system
  10. Implementation of Indirect Space Vector Modulation Strategy for a three phase Matrix Converter in FPGA Cyclone II EP1C12Q240C8 platform,
  11. Design and Implementation of DSP based Space Vector Pulse Width Modulation Strategy for Three Phase Matrix Converter in DSP TMS320LF2407A platform,
  12. A linear induction motor based conveyor system and its power electronic control,
  13. DSP based Robust Control of a 10 kVA STATCOM,
  14. Realisation of a sensorless 4 kW, 1500 rpm Switched Reluctance Motor Drive, and many more.
- B.** In the field related to the **Condition Monitoring of Electrical Machines**, a team under Dr. P. B. Chattopadhyay is actively engaged in the research work for last ten years developing the technology of application of ANN to the condition monitoring of induction motors and wavelet techniques used to detect broken rotor bar, motor current and vibration etc. They are trying to upgrade the condition-monitoring laboratory in the department to international standard. The supervisor has successfully completed two research projects under DST, Govt. of India and AICTE, Govt. of India. Present work is on the applications of various soft computing techniques like artificial neural networks (ANN), support vector machines (SVM) in the field of condition monitoring of induction motors.
- Dr. Chattopadhyay as a visiting professor in the school of computer and Electrical Engineering, Hanyang University, South Korea in fall semester 2008 has performed advanced research works in the area of signal processing.
- C.** In the field of **Smart Energy Saving Device for Power Factor Control** and Power Quality monitoring, Dr. K. (Das) Bhattacharya along with other faculty members and her team of scholars has developed optimization techniques around an embedded system using a DSP BF533 microcontroller that runs on a co-operative agent based algorithm oriented on the Ant Colony System (ACS). The system aims to reduce energy consumption for bulk consumers of electricity connected to the 33KV and 11KV buses. This work aims at optimizing the selection of capacitor banks quickly and using less memory at a reasonably low cost. Optimizing Parameters would include p.f., Voltage profile, Frequency, health and state of capacitors and also the instant of switching.

In comparison to other heuristics, ACS provides better result because it includes following advantages:

- i) Distributed Computation due to a large amount of parallelism offered by the presence of several agents.

- ii) ii) Positive Feedback, as the search proceeds new population of ants who contribute to a higher fitness value in terms of rich pheromone (organic deposition from ants) trail overpowers the one having a weaker pheromone trail. iii) Robustness which enables the colony to find a solution for problems which are dynamically evolving. Research is on for other applications and several publications have yielded.

The above micro-controller based low-cost power factor correction device developed in our laboratory has been accepted by the WBSEDCL for their 11kV-33kV system and approved for its commercial production.

- D. In the field of Advanced Control Systems and Applications,** Dr. A. Sutradhar is working on *Modeling and Control of Physiological Processes*. He has developed the identification techniques for the non-linear glucose-insulin interaction model in NIDDM patients and developed the control algorithms for implantable insulin delivery system in presence of disturbances like food ingestion and physical exercise: The implantable drug delivery systems are currently in clinical trials in developed countries but the same have not been sufficiently addressed in our country. We already have the experience in modeling and designing robust controllers for implantable micro-insulin dispenser system for diabetic patients. A number of critical design and performance obstacles are still there. We would like to continue our research in this area with indigenous biomaterials and devices. Efforts are being made to improve control algorithms so that greater miniaturization of the device is possible. The theoretical results and the simulation studies with available data are believed to be the building blocks necessary to obtain a complete understanding of the adaptive control algorithms applicable to practical situations of dynamics of devices for PIMS. Prototypes will be developed. The implementation of the closed loop implantable drug delivery systems will be undertaken jointly with medical institutions. Other system identification and control algorithms developed in his laboratory include the Artificial Neural Network and various model structure algorithms (like NARX, NARMAX) used to identify and simulate and control of multivariable nonlinear systems like physiological processes, inverted pendulum system etc. Dr. Aparajita Sengupta has been working for quite a long period and contributed a lot in the field of (i) Robust Control applications in aerospace and ballistic problems, (ii) Parameter Estimation, (ii) Model uncertainty, (iii)  $H_\infty$  control, (iv) Robust Kalman filtering and (v) self tuning PID control for linear and non-linear systems etc. Dr. Anindita Sengupta has developed several algorithms and tools for (i) Analysis of Continuous Time dynamic Systems by Triangular Orthogonal Functions, (ii) Microprocessor based identification of sampled data system with/without hold device using a set of Sample-and-Hold and Direct Delta Functions, (iii) Online measurement of Triangular Domain Spectral coefficient of a sine wave, (iv) Online application of Wavelet Transform methods for signal analysis and (v) Identification of Sampled Data System with/without hold devices, (vi) Application of ANN in control system etc.

- E. In the field of Stability, Economic and Optimum Operation and Control of EHV Power Transmission System,** Dr. A. Chakrabarti has been working for quite a long period. Indian power system is on the fast track of development. The essence of the development activity in this area with proper planning monitoring and control of the entire system of operation right from generation to distribution, power transmission stability is possibly one of the most important aspects in proper operation of the power system, particularly when power transmission in India is being upgraded in the recent days. In India the transmission system being a longitudinal, it needs in depth study and research for successful power transmission economically and at stable state. The voltage stability of power systems in developing country and concentrated in the research of power transmission has been investigated. The following items highlight the achievements and results of the research in this field.

1. The criterion of voltage stability in a multibus power system has been developed and application of static VAR compensators to mitigate the problem have been explored.
2. Detail model of multibus power system equivalenced as a two bus model have been developed.
3. Accurate model of static VAR compensator has been developed for simulation in multimachine power system.
4. HVDC transmission has been explored to improve the transient stability.
5. Voltage security and different aspects of contingency analysis have been investigated.
6. A variety of voltage stability indicators have been investigated and applied to different power systems. The result have been analysed and interpreted.
7. Small signal stability problem of longitudinal power system is being investigated and attempt is being made to mitigate this problem.
8. Optimum location of SVC and PSS has been explored.
9. ANN has been implemented in order to simulate the highly complex the voltage stability problem in a multibus power system.
10. Digital protection system for distribution feeder has been developed.
11. Matrix analysis has been extensively used in addition to eigenvalue analysis in order to investigate the performance of operation of power system.
12. Effective researchs have been conducted in order to observe multi frequency resonance problem on EHV grid transformers.

## **Foreign visits and Invited Lectures**

Dr. K. Mukherjee visited Centre of Hybrid and Automotive Research and Green Energy (CHARGE), University of Windsor, Canada.

## Visitors to the department (Indian / Foreign)

| Date       | Name of the Speaker   | Lecture Topic   |
|------------|---|---|
| 06/01/2014 | <b>Dr. Rajesh Ghosh</b><br>Staff Electrical Engineer, American<br>Power Conversion by Schneider<br>Electric                                     | Resonant DC-DC Power<br>Conversion for UPS Systems  |
| 08/01/2014 | <b>Ms. Xiaomin Lu,</b><br>Centre for Hybrid Automotive<br>Research & Green Energy, University<br>of Windsor, Canada                             | 1. Research & Development in<br>Transportation Electrification<br>2. A Novel Parameter Determination<br>Method for Line-Start Permanent<br>Magnet Synchronous Machine |
| 08/01/2014 | <b>Dr. Soumitra Das,</b><br>Post doctoral Research Associate,<br>Indian Institute of Science, Bangalore   | Study on Pulsewidth Modulation<br>Techniques for a Neutral-Point-<br>Clamped Voltage Source Inverter  |
| 10/09/2014 | <b>Mr. Ananda Majumdar,</b><br>General Manager- Marketing &<br>Product Development – MV Motors,<br>Marathon Electric Motors Ltd.,<br>Kolkata    | Impact of Variable Speed Drives<br>and Energy Efficiency on Induction<br>Motors : Manufacturer's Perspective  |
| 13/10/2014 | <b>Mr. Subhadeep Sen,</b><br>Scientific Officer-D,<br>Control Engineer, Nuclear Power<br>Corporation of India Ltd. KGS-3&4,<br>Kaiga, Karnataka | Nuclear Reactor Engineering   |
| 14/11/2014 | <b>Mr. Arijit Basuray,</b><br>Managing Director and CEO,<br>Neo Tele-tronix Pvt. Ltd., Kolkata  | Pulsed Power and its Application in<br>Electrical Testing   |

## Training and Placement

85% students placed

## New Academic / Research Initiatives

### a) Academic Collaboration

Ms. Xiaomin Lu, doctoral candidate in Centre for Hybrid Automotive Research and Green Energy, University of Windsor visited IEST, Shibpur, EE Dept. and performed research with Kaushik Mukherjee for one and half months (December 2013-January 2014). She has received her PhD degree eventually in October 2014 with Dr. Narayan Kar, Associate Professor, University of Windsor, Canada as her supervisor and Dr. Kaushik Mukherjee as her co-guide. Mr. K. L. V. Iyer, another doctoral candidate at Centre for Hybrid Automotive Research and Green Energy, University of Windsor is currently visiting IEST Shibpur, EE Dept. (December 2014 – February 2015) to perform collaborative research with Dr. Kaushik Mukherjee.

### b) Industrial Collaboration

Two short term courses were held in February 2014 and December 2014 for CESC junior engineers. These refresher courses, each of 6 days duration covered theoretical and laboratory-based aspects of Electrical Engineering.



***Department of  
Electronics & Telecommunication  
Engineering***





## About the department

The Department of Electronics and Telecommunication Engineering started its journey in July, 1968 after its nucleation from the Department of Physics & Telecommunication from the erstwhile Bengal Engineering College. The first batch of Graduates & Post Graduate passed out in 1971 & 1974 respectively. The Department offers Bachelor of Engineering (B.E.) course in Electronics & Telecommunication Engineering for a duration of 4 years (8 Semesters). Master of Engineering (M.E.) programs of 4 semester duration (2 years) are offered for three specializations, viz. Digital Systems & Instrumentation, Microwave Communication, and Communication & Signal Processing. Department also offers Ph.D. degree in Electronics and Telecommunication Engineering in various fields.

Considerable effort has been put forward during the last couple of years towards setting up new undergraduate and postgraduate laboratories and augmenting the facilities in the existing laboratories. The department does a commendable performance in research and development works. A high number of research projects worth nearly Rs 2.5 crore are carried out during the current financial year with the assistance of various funding agencies leading to high volume quality publications in international journals and conferences.

## Academic Programmes :

### Undergraduate Level

|      |   |                                |
|------|---|--------------------------------|
| I.   | Degree offered  | Bachelor of Engineering (B.E.) |
| II.  | Sanctioned students' intake   | 40                             |
| III. | Additional intake through lateral entry in 3 <sup>rd</sup> Semester | 02                             |

### Post Graduate Level

|      |   |   |
|------|---|---|
| I.   | Degree offered  | Master of Engineering (M.E.)  |
| II.  | Sanctioned students' intake                           | 8 + 8 + 18 = 34   |
| III. | Additional intake through other programmes (i.e. QIP) | Nil   |
| IV.  | Specialisations in                                    | a) Digital System and Instrumentation<br>b) Microwave Communication<br>c) Communication and Signal Processing |

### Doctoral & Post Doctoral Research Programme

|      |  |                     |
|------|--|---------------------|
| I.   | Degree offered :                             | Ph.D. (Engineering) |
| II.  | No of Candidates enrolled registered awarded | 8                   |
| III. | No. of Candidates registered                 | 8                   |
| IV.  | No. of Candidates awarded                    | 4                   |

**Faculty position :**

Sanctioned faculty post : 18

Vacant Post : 6

**Faculty profile**

| <b>Name</b>                        | <b>Designation</b>  | <b>Highest Quali-<br/>fication</b> | <b>Specialisation / Research<br/>Area</b>   | <b>Contact No. &amp; E-mail</b>  |
|------------------------------------|---------------------|------------------------------------|---|--|
| Dr. Sekhar Ranjan Bhadra Chaudhuri | Professor           | Ph. D.                             | Design & Dev. of Small Antenna, Network & Information Security, Digital System Design   | <a href="mailto:prof.srbc@gmail.com">prof.srbc@gmail.com</a><br><a href="mailto:prof_srbc@yahoo.com">prof_srbc@yahoo.com</a>               |
| Dr..Baidynath Ray                  | Professor           | Ph.D.                              | Signal Processing, Image Processing and VLSI design and testing   | <a href="mailto:bnr@telecom.becs.ac.in">bnr@telecom.becs.ac.in</a>   |
| Prof. Arabinda Roy                 | Associate Professor | M.E.                               | Microprocessor based system, Signal Processing, Power Electronics   | <a href="mailto:arabinda@telecom.becs.ac.in">arabinda@telecom.becs.ac.in</a><br><a href="mailto:oruroy@yahoo.co.in">oruroy@yahoo.co.in</a> |
| Dr. Monojit Mitra                  | Professor           | Ph.D.                              | Fabrication of Microwave Device Like IMPATT, its Characterization and System development  | <a href="mailto:monojit_m1@yahoo.co.in">monojit_m1@yahoo.co.in</a>   |
| Dr. Santanu Das                    | Professor           | Ph.D.                              | Planar circuits, & antennas, metamaterial, RFID   | <a href="mailto:santanumdas@yahoo.com">santanumdas@yahoo.com</a><br><a href="mailto:santanumdas@gmail.com">santanumdas@gmail.com</a>       |
| Dr. Susanta Kumar Parui            | Associate Professor | Ph.D.                              | Microstrip and CPW based Printed Circuits and antennas, Frequency selective surfaces (FSS), Electro-magnetic bandgap structures (EBG), Defected ground structures (DGS) | <a href="mailto:arkapv@yahoo.com">arkapv@yahoo.com</a>   |
| Prof. Ayan Banerjee                | Associate Professor | M.Tech.                            | VLSI Architectures Design for Communication & Biomedical Engineering, DSP architecture design using CORDIC  | <a href="mailto:ayanb12@gmail.com">ayanb12@gmail.com</a>   |
| Dr. Chirasree Roychoudhury         | Assistant Professor | Ph.D.                              | Electrical biosensors with electronic interface, electrical studies of biological cells   | <a href="mailto:chirasreepram@yahoo.com">chirasreepram@yahoo.com</a>   |
| Dr. Tamaghna Acharya               | Assistant Professor | Ph.D.                              | Wireless Communication and Networks, Dynamic spectrum access and software defined radio networks, Green communications  | <a href="mailto:tamaghna_acharya@yahoo.com">tamaghna_acharya@yahoo.com</a>   |
| Dr. Partha Bhattacharyya           | Assistant Professor | Ph.D.                              | Nanomaterial based Chemical Sensors, MEMS based Sensors and Its Signal Processing, Low Power VLSI Design  | <a href="mailto:pb_etc-besu@yahoo.com">pb_etc-besu@yahoo.com</a>   |
| Prof. <u>Debasis</u>               | Assistant           | M.Tech.                            | Applied Electromagnetics  | <a href="mailto:debasisiit@gmail.com">debasisiit@gmail.com</a> , d   |

|                                     |                     |      |   |  |
|-------------------------------------|---------------------|------|---|--|
| <u>Mitra</u>                        | Professor           |      | and Antenna Engineering                                 | <a href="mailto:ebasis.mitra@telecom.be.cs.ac.in">ebasis.mitra@telecom.be.cs.ac.in</a> |
| Prof. <u>Ankita Pramanik</u>        | Assistant Professor | M.E. | Error Control Coding, Image Processing, GPS, MIMO, STBC | <a href="mailto:pramanikankita@gmail.com">pramanikankita@gmail.com</a>                 |
| Prof. Abhijit Chandra (Contractual) | Assistant Professor | M.E. | Communication and Signal Processing                     | <a href="mailto:abhijit922@yahoo.co.in">abhijit922@yahoo.co.in</a>                     |

#### **Awards and Laurels received by the faculty members :**

##### **By Dr. Chirasree RoyChaudhuri**

- Women Excellence Award, DST Science and Engineering Research Board, 2013
- Selected as Associate Editor of IEEE Sensors Journal

##### **By Dr. Partha Bhattacharyya**

- Best poster paper Award for the paper “Development of TiO<sub>2</sub> Nanostructure based Devices for Alcohol Detection” authored by Arnab Hazra, Partha Bhattacharyya, Young Scientist Colloquium-2013, Organized by Materials Research Society of India (Kolkata chapter), 28<sup>th</sup> August, 2013, Jadavpur University, Kolkata, India.

#### **Research area:**

##### **Microwaves and Antennas**

- Planar circuits and antennas
- Microwave avalanche devices
- IMPATT amplifiers and oscillators
- Meta-materials and its applications
- Phased array antennas
- Electromagnetic band-gap materials
- Surface integrated waveguides (SIW)
- RFID and its applications

##### **Microelectronics, Devices and VLSI**

- Biosensors
- MEMS based pressure and conductivity sensors
- Nanostructured semiconducting metal oxides for sensor applications
- Chemical sensors
- MEMS based gas sensors and its CMOS integration
- VLSI design and testing
- VLSI based signal processing
- VLSI Architectures for Communication and Biomedical Engineering

##### **Communication and Signal processing**

- Wireless Ad-hoc and sensor networks
- Cognitive Radio networks
- Hardware efficient FIR filter design
- Space-time coding for wireless communication
- DSP algorithms
- Design of CDMA spreading codes
- Medical imaging
- Sensor signal processing
- CORDIC based DSP architectures

**Research facilities:**

| Areas                               | Equipments / Set up   | Design Softwares / Tools   |
|-------------------------------------|---|--|
| Microwaves and Antennas             | <ul style="list-style-type: none"> <li>• Network Analyser (10 MHz – 20 GHz)</li> <li>• Signal Generator (10 KHz – 3 GHz)</li> <li>• Power Meter ( DC – 26 GHz)</li> <li>• PCB fabrication set up by photolithography</li> <li>• Prototype fabrication by milling process</li> <li>• Radiation characteristics measurement bench</li> </ul>  | <ul style="list-style-type: none"> <li>• IE3D</li> <li>• HFSS</li> <li>• CST studio</li> <li>• FDTD</li> <li>• Empire</li> </ul>                 |
| Microelectronics, Devices and VLSI  | <ul style="list-style-type: none"> <li>• E-Beam Evaporation System</li> <li>• Mass Flow controller &amp; Mass flow Meter</li> <li>• Spin Coating Unit</li> <li>• Dip Coating Unit</li> <li>• Laminar Flow Clean Bench</li> <li>• Millipore water purification system</li> <li>• Gas line manifold</li> <li>• Temperature Controlled annealing Furnace (1050°C)</li> <li>• Portable Ph meter, range 1-14 ph</li> <li>• Temperature Controlled Oven (upto 300°C)</li> </ul> | <ul style="list-style-type: none"> <li>• T-spice</li> <li>• Comsol</li> <li>• Coventorware</li> <li>• Intellisuite</li> <li>• Supreme</li> </ul> |
| Communication and Signal processing | <ul style="list-style-type: none"> <li>• Spectrum analyzer (9 kHz – 3.0 GHz)</li> <li>• Vector signal generator (10 KHz – 3 GHz)</li> <li>• Arbitrary function generator</li> <li>• DSO (500 MHz)</li> </ul>  | <ul style="list-style-type: none"> <li>• MATLAB</li> </ul>   |

**Name of the laboratories:**

|   |   |
|---|---|
| Basic Electronics Engg. Lab                     | Waveguides and Antenna Lab                        |
| Network Theory Lab                              | Wireless Communication and Networking Lab         |
| Electronic Devices Lab                          | Digital Image Processing & Computer Vision Lab    |
| Analog Electronics Lab                          | Microwave and Radar Engineering Lab               |
| Analog Communication Systems Lab                | VLSI Design Lab                                   |
| Digital Electronics Lab                         | Opto-Electronics & Optical Communication Lab      |
| Microelectronics Lab                            | Thin film/Sensors Lab                             |
| Digital Communication Lab                       | RF and Microwave measurement Lab                  |
| Integrated Circuits and Systems Lab             | Control Engineering Lab                           |
| Microprocessors and Microcontrollers Lab        | Audio & Video Engineering Lab                     |
| Electronic Instrumentation and Measurements Lab | Power Electronics Lab                             |
| Digital Signal Processing Lab                   | Nano-thin films & solid state gas sensor devices  |
| Advanced Microprocessors Lab                    | Semiconductor device/sensor characterization lab. |

**Support staff position:**

(i) Sanctioned technical post : 10 Vacant : 4

(ii) Technical staff profile

| Name                        | Designation         | Highest Qualification        | Contact No. | E-mail   |
|-----------------------------|---------------------|------------------------------|-------------|--|
| Mr. Rajat Mukherjee         | Technical Asst.     | Diploma in Electrical Engg.  | 9432367342  | mukherjeera.2009@rediffmail.com  |
| Mr. Brindaban Patta         | Jr. Technical Asst. | Diploma in Electronics Engg. | 9830970287  | <a href="mailto:brindaban_patta@yahoo.co.in">brindaban_patta@yahoo.co.in</a>             |
| Smt. Indrani Santra         | Jr. Technical Asst  | Diploma in Electronics Engg. | 9434223985  | <a href="mailto:indrani.santra08@gmail.com">indrani.santra08@gmail.com</a>               |
| Mr. Biswajit Samanta        | Jr. Technical Asst  | Diploma in Electronics Engg. | 9002322109  | <a href="mailto:biswajit_samanta21@rediffmail.com">biswajit_samanta21@rediffmail.com</a> |
| Mr. Pradip Mistry           | Jr. Technical Asst  | Diploma in Electronics Engg. | 9432269081  | <a href="mailto:pradip.mistry75@gmail.com">pradip.mistry75@gmail.com</a>                 |
| Mr. Dibyendu Pal            | Mechanic            | H.S.                         | 9831342357  | <a href="mailto:paul.dibendu@rediffmail.com">paul.dibendu@rediffmail.com</a>             |
| Suvankar Bose (Contractual) | Jr. Technical Asst  | Diploma in Electronics Engg. | 9432353671  | <a href="mailto:suvankarl@yahoo.co.in">suvankarl@yahoo.co.in</a>                         |
| Mouli Das (Contractual)     | Jr. Technical Asst  | Diploma in Electronics Engg. | 9433900278  | <a href="mailto:mouli.mouli2008@gmail.com">mouli.mouli2008@gmail.com</a>                 |

**Ongoing Sponsored Research / projects :**

| Name of Project  | PI                        | Sponsoring agency | Prof value in Rs. Lakh | Duration |
|--|---------------------------|-------------------|------------------------|----------|
| Nanostructured Immunosensor Array for Rapid, Portable and Sensitive Food Toxin Detection   | C.RoyChaudhuri            | DST, SERB         | 18                     | 2013-16  |
| Efficacy of silicon microchannel cytosensor platform for electrical profiling of multiple mammalian cells                                    | C.RoyChaudhuri            | DST, SERB         | 54.6                   | 2012-15  |
| Establishment of MEMS Design Center under National Program on Micro and Smart Systems(NPMASS)  | C.RoyChaudhuri            | ADA               | 17                     | 2009-14  |
| Development of Metal-Insulator-Metal based Volatile Organic Compound Sensor for Monitoring of Ripeness of Orange                             | Dr. Partha Bhattacharyya  | INSA              | 15                     | 2013-16  |
| A novel Metal-Insulator-Metal (MIM) device for detection of early spoilage of potato during Storage  | Dr. Partha Bhattacharyya  | DST               | 14.5                   | 2012-14  |
| Development of a Chemical Sensor to Monitor the Spoilage of Potato in the Cold Storage   | Dr. Partha Bhattacharyya  | CSIR              | 14                     | 2011-14  |
| Current mode FPAA Design   | Dr. B.N. Ray              | SERC-DST          | 29.33                  | 2010-14  |
| CMOS VLSI Design   | Dr. B.N. Ray              | SERC-DST          | 16                     | 2011-14  |
| Studies on Retro-directive –Array For Space Applications   | Dr. S.R. Bhadra Chaudhuri | ISRO              | 17.46                  | 2013-15  |
| Design and Development Of Substrate Integrated Wave-guide (SIW) based RF circuits and components Using Meta-materials in Ku-band Application | Dr. Susanta Kumar Parui   | DST-SERC          | 31                     | 2011-15  |

|  |                         |      |               |         |
|--|-------------------------|------|---------------|---------|
| Development of Microstrip Phased Array Antenna System for Eliminating Scan Blindness by Using Defected Ground Structures | Dr. Susanta Kumar Parui | CSIR | 20            | 2012-15 |
| Design and Development of Compact and Wideband Microstrip Filters Using Electromagnetic Bandgap Technology               | Dr. Santanu Das         | CSIR | 17            | 2010-13 |
| <b>TOTAL</b>   |                         |      | <b>263.89</b> |         |

**Details of publications of each faculty member :**

Journal – 37  
Conference – 31  
Books/Monographs – 01

List of publications – **Annexure I**

**Seminar / Workshops / Conferences / Training programme organized by the department**

| Date       | Title                                | Organizer                  | Speaker                  |
|------------|--------------------------------------|----------------------------|--------------------------|
| 21.02.2014 | IEEE Distinguished lecture programme | BESU, IEEE Kolkata Chapter | Dr. Goutam Chattopadhyay |
| 21.03.2014 | History of wireless communication    | BESU                       | Prof. P.K. Sinha Roy     |

**Technology Developed / Innovations:**

- Packaged multiple wireless sensor modules for health monitoring of elderly people

**Advancements under TEQIP – Phase II :**

- Faculties, research scholars, students of the department participated in international and national conferences / workshops / seminars / short term courses. This participation is supported by TEQIP-Phase II by extending necessary financial assistance. Participation in these events has been very beneficial for improving pedagogical and research skills, and enriching knowledge in the same and different domains.
- The department is equipped with some high-end equipments and softwares to augment the facilities in the existing laboratories.
- Fellowship is received from TEQIP-Phase II for quite a few deserving students for pursuing Ph.D. program leading to high volume of research publications.
- The financial assistance from TEQIP-Phase II has helped the department to organize workshops / seminars / lecture series etc. This has enriched the students, faculties, technical staffs with the knowledge of advancement of technology in diversified areas besides the regular course curriculum.

**Foreign visits and Invited Lectures:**

- Dr. Partha Bhattacharyya attended “The 7th International Conference on Sensing Technology (ICST 13)”, organized by Messy University, Wellington, New Zealand, December 3-5, 2013.
- Dr. Partha Bhattacharyya visited Intel Corporation, Ronler Acres, Hillsboro, USA, as Visiting Scientist 22<sup>nd</sup> June – 8<sup>th</sup> July, 2013.
- Dr. Chirashree RoyChaudhuri visited RWTH Aachen, Germany in March 2013 for 15 days in Helmholtz Institute of Biomedical Engineering for research experience in the area of biomedical instrumentation.
- Dr. Susanta Kumar Parui attended and presented a paper in the IEEE International Symposium on Phased Array System and Technology (Array 2013)

**Visitors to your Department ( Indian & Foreign) :**

Dr. Goutam Chattopadhyay – Senior Engineer, Jet Propulsion Laboratory  
California Institute of Technology, USA

**Training and Placement :**

The students fared very well in campus interviews. 95% students got job opportunity in various reputed core and IT industries. Finally a few of them chose to pursue masters’ degree in premier institutes like IIT and two went to premier institutes in USA for higher studies, MS leading to Ph.D. with full financial assistance.

**New Academic / Research Initiatives****Academic Collaboration**

A collaborative research project is going on with IIT-Kharagpur at Kalpana Chawla Space Research Centre with the Electronic & Communication Engineering Dept. with effect from May, 2013 up to 2015. The project is on “Studies on Retro-directive –Array for Space Applications”. The total project cost sanctioned is 46.92 Lakhs. The departmental part is amounting to 50% of the total sanctioned value, i.e., Rs.17.46 Lakhs.

**Others****Books/ Monograms:**

T. Acharya and S. P. Maity, “Power allocation in cognitive radio in energy constrained wireless ad hoc networks,” Cognitive Radio Technology Applications for Wireless and Mobile Ad Hoc Networks, Edited by N. Meghnathan and Y B. Reddy, Published by IGI Global , USA, June , 2013, pp.248-270



## ANNEXURE - I

### Paper Published

#### International and National Journals

1. H. Ghosh, C. RoyChaudhuri, 'Ultrasensitive Food Toxin Biosensor Using Frequency Based Signals of Silicon Oxide Nanoporous Structure', *Applied Physics Letters*, vol.102, p.243701, 2013 (Impact Factor: 3.79)
2. D. Mondal and C. RoyChaudhuri, "Extended Electrical Model for Impedance Characterization of Cultured HeLa Cells in Non-Confluent State Using ECIS Electrodes", *IEEE Transactions on Nanobioscience*, vol.12, pp.239-246, 2013.(Impact Factor: 1.42)
3. C. RoyChaudhuri, D. Mondal, "Electrode Optimization for Impedance Evaluation of Biological Cell Culture under Variable Frequency Low Intensity Sinusoidal Electric Field", *IEEE Transactions on Dielectric and Electric Insulation*, vol.20, pp.382-390, 2013.(Impact Factor: 1.46)
4. N. Samanta, O. Kundu and C. RoyChaudhuri, "A Simple Low Power Electronic Readout for Rapid Bacteria Detection with Impedance Biosensor", *IEEE Sensors*, vol.13, pp.4716-4724, 2013. (Impact Factor: 1.52)
5. A.Barui, N.Mandal, S.Majumdar, R.K.Das, S.Sengupta, P.Banerjee, C. RoyChaudhuri, J.Chatterjee, "Assessment of Molecular Events during *in vitro* Re-epithelialization under Honey-Alginate Matrix Ambience", *Materials Science and Engineering B (Elsevier)*, vol.33, pp.3418-3425, 2013. (Impact Factor: 1.89)
6. N.Banerjee, B. Bhowmik, S. Roy, C.K. Sarkar, **P. Bhattacharyya**, Anomalous Recovery Characteristics of Pd Modified ZnO Nanorod Based Acetone Sensor, *Journal of Nanoscience and Nanotechnology (American Scientific Publishers)*, vol. 13, pp.1-8. (2013) **(Impact Factor: 1.56)**.
7. S.Roy, N.Banerjee, C.K.Sarkar and P. Bhattacharyya, Development of an Ethanol Sensor based on CBD Grown ZnO Nanorods, *Solid State Electronics (Elsevier)*, vol. 87, pp. 43-50 (2013).**(Impact Factor: 1.466)**.
8. Hazra, S. Das, J Kanungo, E. Bontempi, C. K. Sarkar, P. Bhattacharyya, Sukumar Basu, Influence of Temperature, Voltage and Hydrogen on the Reversible Transition of Electrical Conductivity in Sol-Gel Grown Nanocrystalline TiO<sub>2</sub> Thin Film, *Journal of Materials Science: Materials in Electronics (Springer)*, vol. 24 pp.1658-1663 (2013). (Impact Factor: 1.076).
9. Z. Darmastuti, P. Bhattacharyya, M. Andersson, J. Kanungo, S. Basu, P-O. Käll, L. Ojamäe, A. Lloyd Spetz, SiC-FET Methanol Sensors for Process Control and Leakage Detection, *Sensors and Actuators B (Elsevier)*, vol. 178 (2013) pp.385-394. **(Impact Factor: 3.668)**.
10. Nabaneeta Banerjee, Sunipa Roy, Chandan Kumar Sarkar, Partha Bhattacharyya, High Dynamic Range Methanol Sensor based on Aligned ZnO Nanorods, *IEEE Sensors Journal (IEEE)*, vol. 13, No. 5 pp.1669-1676 (2013). **(Impact Factor: 1.852)**.
11. D. Ghosh, P. C. Mondal, D. Kayal, P. Bhattacharyya, A. Dandapat, A Novel Design of Seven Segment Decoder using Cyclic Combinational Technique, *Journal of Low Power Electronics (American Scientific Publishers)*, vol. 9, pp. 1-6 (2013) **(Impact Factor: 0.485)**.
12. Saha, A. Banerjee, P. Bhattacharyya, A. Dandapat, Improved Matrix Multiplier Design for High Speed DSP Applications, *IET Circuits, Devices and Systems (IET)*, pp. 1-11 Vol. (2013) **(Impact Factor: 0.547)**.
13. D. Acharyya, A. Hazra, K. Dutta, R. K. Gupta, P. Bhattacharyya, Highly Repeatable Multi Level Resistive Switching Characteristics of Au/TiO<sub>2</sub>/Ti Memory Device, *Semiconductor Science and Technology (Institute of Physics (IOP Publishing))*, Vol. 28 pp. 125001-125007 (2013) **(Impact Factor: 2.206)**.
14. T. Acharya and G. Paul, " **Maximum lifetime broadcast communications in cooperative multi-hop wireless ad hoc networks: centralized and distributed approaches,**" *Elsevier Journal of Ad Hoc Networks*, vol.11, no 6, August 2013, pp.1667-1682. 5yrs impact factor 1.957, Thomson-Reuters (SCI) 2012 Telecom jnl ranking: 21/77.
15. M. R. Kongara, G. Patil, Sreedhar T.V.S. and Ankita Pramanik, "An FPGA implementation of Irregular, Quasi-cyclic Low-density Parity-check codes," *Labtalk*, January 2013.
16. Ankita Pramanik, Pragadeeswaran and L. Borman, "Binary – Offset - Carrier Modulation for a 38.4 kbps Radio," *Labtalk*, July 2013.
17. Ayan Banerjee and Anindya Sundar Dhar "Pipelined VLSI Architecture Using CORDIC for Transform Domain Equalizer" *Journal of Signal Processing Systems*, Springer, Vol.70, No.1, pp. 39-48, January 2013.
18. Debasis Mitra, S. Paul, D. Bhattacharya and Sekhar Ranjan Bhadra Chaudhuri, "Radiated Power Enhancement of Quadrupole source using Metamaterials", *Microwave and Optical Technology Letters (MOTL) WILEY*, Vol. 55, Issue 11, Nov-Dec, 2013.p.p.2620-2624.

19. Krishnendu Chattopadhyay, Tannisita Mitra, Dhruba Das, Santanu Das and Sekhar Ranjan Bhadra Chaudhuri, "Bandwidth Enhancement of Hexagonal Wide Slot Antenna Using a Tuning Stub", IETE Journal of Research, Vol.59, Issue 6, Nov-Dec 2013.
20. Sirshendu Hore, Tanmay Bhattacharya and S. R. Bhadra Chaudhuri, "A Robust Medical Image Authentication Technique using QR Code and DWT", International Journal of Computer Applications (ISSN: 0975 – 8887), Volume 83 – No.16, Nov-Dec 2013, pp. 21-26
21. Sirshendu Hore, Tanmay Bhattacharya and S. R. Bhadra Chaudhuri, "A Sustainable Medical Image Authentication Technique in Spatial Domain Using Multiple QR Code", Int. Journal of Engineering Research and Applications (ISSN: 2248-9622), Vol. 3, Issue 6, Nov-Dec 2013, pp. 2042-2047.
22. Krishnendu .Chattopadhyay, Swarup Das, Santanu Das and Sekhar Ranjan Bhadra Chaudhuri, "Ultrawideband Performance of Printed Hexagonal Wideslot Antenna with Dual Band-Notched Characteristics", Progress in Electromagnetic Research, PIER-'C', October 2013.vol.44, 83-93,
23. P.S.Banerjee, J.Paul Choudhuri, and S.R.Bhadra Chaudhuri, "Fuzzy Membership function in a Trust Based AODV for MANET", International Journal of Computer Network & Information Security, IJCNIS, September, 2013, 12, 27-34. DOI: 10.5815 / ijcnis.2013.12.04.
24. Krishnendu Chattopadhyay, Somdotta Roy Chowdhury, Santanu Das and Sekhar Ranjan Bhadra Chaudhuri, "Wideband Microstrip-line-fed Hexagonal Slot Antenna for WiMAX and Wireless Local Area Network Applications" ,The Journal of Engineering, ,IET, UK, 2013,DOI 10.1049/joe.2013.0024.
25. Tapan Mondal and Santanu Das, "Microstrip feed Spanner Shape Monopole Antennas for Ultra Wide Band Applications" *Journal of Microwaves, Optoelectronics and Electromagnetic Applications*, Vol.12, No.1, pp.15-22, January 2013.
26. Tamasi Moyra, Santanu Das and Susanta Kumar Parui, "Design And Validation Of Low-Pass Filter Using Microstrip Stub And Defected Ground Structure," *Microwave And Optical Technology Letters*, Vol.55, No.3, pp.506-515, March 2013.
27. Tapan Mondal and Santanu Das, "UWB Printed Plaque Monopole Antennas for Tri-Band Rejection" *Microwave and Optical Technology Letters*, Vol.55, No.3, pp.674-680, March 2013.
28. Tapan Mondal and Santanu Das, "An Optimal Design Of CPW-Fed UWB Aperture Antennas With WIMAX/WLAN Notched Band Characteristics," *Progress In Electromagnetics Research C*, Vol.35, pp.161-175, 2013
29. Tapan Mondal and Santanu Das, "A Coplanar Waveguide-Fed Ultra Wideband Hexagonal Slot Antenna With WLAN Band Rejection," *Journal of Radio Electronics*, Vol.N9, pp.1-17, 2013
30. Somdotta Roy Choudhury, Susanta Kumar Parui and Santanu Das, "Design of a Compact Wideband Log Periodic Spur Line Bandstop Filter," *International Journal of Engineering and Advanced Technology (IJEAT)*, Vol.3, Issue.1, pp.5-13, October 2013
31. Rajasree Hazra, Chandan Kumar Ghosh and **Susanta K. Parui**, "P-shaped Wearable Antenna for ISM band at 2.45 GHz" International Journal of Innovation and Applied Studies, Vol. 4 No. 3, pp. 497-501 November 2013
32. Chandan Kumar Ghosh and **Susanta Kumar Parui**, "Reduction Of Mutual Coupling Between E-Shaped Microstrip Antennas by Using A Simple Microstrip I-Section" *Microwave and Optical Technology Letters*, Vol. 55, No. 11, pp.2544-2549, November 2013
33. Chandan Kumar Ghosh, Biswarup Rana and **Susanta Kumar Parui**, "Reduction of cross polarization of slotted microstrip antenna array using spiral-ring resonator," *Microwave and Optical Technology Letters*, (John Wiley & Sons,Inc) Vol 55 No. 9, pp. 2083-2088, September 2013
34. Chandan K. Ghosh and **Susanta K.Parui**, "Cross-polarization reduction of E-shaped Microstrip Array using Spiral-ring Resonator" *Progress In Electromagnetics Research C*, Vol.38, pp.217-227, 2013
35. Chandan Kumar Ghosh, **Arabinda Roy** and **Susanta K. Parui**, "Composite Lowpass Filter Realized by Image Parameter method and Integrated with Defected Ground Structures," *International Journal of Computers & Technology*, Vol 4 No. 2, pp. 583-591, 2013
36. Rajasree Hazra, Chandan Kumar Ghosh and **S.K. Parui**, "Mutual coupling reduction between closely spaced microstrip patch elements using DGS" *Journal of Academia and Industrial Research (JAIR)*, Volume 2, Issue 2 pp.142-145, July 2013
37. Chandan K. Ghosh and **Susanta K.Parui**, "Cross-polarization reduction of E-shaped Microstrip Array using Spiral-ring Resonator" *Progress In Electromagnetics Research C*, Vol.38, pp.217-227, 2013

## International and National Conferences papers

1. C.RoyChaudhuri, H.Ghosh, "Nanostructured Silicon Oxide Immunosensor as Frequency Selective High Performance Biomolecule Detection Platform", International Conference in Asia by Materials Research Society, 16<sup>th</sup>-20<sup>th</sup> December 2013, IISc Bangalore.
2. D.Mondal, C. RoyChaudhuri, "Electrical Characterization of Biological Cells on Porous Substrate using COMSOL Multiphysics", COMSOL Conference, October 17-18, 2013, Bangalore, India.
3. N.Das, C.RoyChaudhuri, "Modeling of Silicon Oxide Nanoporous Structure for Sensitive and Specific Detection of Food Toxin", p.52, National Seminar-cum-Workshop on "Sensor and Sensing System for Taste Characterization of Food and Agro Products", May 09-10, 2013, IIT Kharagpur, India.
4. H.Ghosh, C.RoyChaudhuri, "Ultrasensitive food toxin biosensor using frequency based signals of silicon oxide nanoporous structure", p.41, National Seminar-cum-Workshop on "Sensor and Sensing System for Taste Characterization of Food and Agro Products", May 09-10, 2013, IIT Kharagpur, India.
5. C.RoyChaudhuri, "Nanoporous Silicon Oxide Immunosensor as Frequency Selective Biomolecule Detection Platform", pp.21-22, DBT-TEQIP sponsored national workshop on Modern Biotechnology, 5<sup>th</sup> -11<sup>th</sup> December 2013, NIT Durgapur and CMERI Durgapur.
6. Integration of ZnO Nanoflakes with MEMS Platform and its Application as Gas Sensor, P. Bhattacharyya, S. Roy, C. K. Sarkar, The 7th International Conference on Sensing Technology (ICST-2013), December 3-5, 2013, Wellington, New Zealand.
7. Low Temperature Low ppm Acetone Detection by Pd/TiO<sub>2</sub>/p-Si Metal-Insulator-Semiconductor Devices, A. Hazra, B. Bhowmik, K. Dutta, P. Bhattacharyya, The 7th International Conference on Sensing Technology (ICST-2013), December 3-5, 2013, Wellington, New Zealand.
8. ASIC Implementation of High Speed Processor for Computing Fast Hartley Transformation, Prabir Saha, Partha Bhattacharyya, Deepak Kumar and Anup Dandapat, International Conference on Advanced Electronic Systems (ICAES-2013), September 21-23, 2013, Organized by CSIR-Central Electronics Engineering Research Institute, Pilani.
9. Low Temperature Acetone Sensor Based on Sol-gel Grown Nano TiO<sub>2</sub> Thin Film, B. Bhowmik, K. Dutta, N. Banerjee, A. Hazra, P. Bhattacharyya, International Conference on Emerging Trends in Computing, Communication and Nanotechnology (ICE-CCN 2013) be held at Infant Jesus College of engineering and Technology, Tutikorin, Tamilnadu, India during March 25-26, 2013.
10. Electrochemically Grown Nono-Structured TiO<sub>2</sub> Based Low Power Resistive Random Access Memory, A. Hazra, D. Acharyya, P. Bhattacharyya, International Conference on Emerging Trends in Computing, Communication and Nanotechnology (ICE-CCN 2013) be held at Infant Jesus College of engineering and Technology, Tutikorin, Tamilnadu, India during March 25-26, 2013.
11. Pd Modified ZnO Nanorod based High Dynamic Range Hydrogen Sensor, Nabaneeta Banerjee, Sunipa Roy, Chandan Kumar Sarkar, Partha Bhattacharyya, 13th IEEE International Conference on Nanotechnology (2013), August 5-8, 2013, Shangrila Hotel, Beijing, China.
12. Development of TiO<sub>2</sub> Nanostructure based Devices for Alcohol Detection, Arnab Hazra, Partha Bhattacharyya, Young Scientist Colloquium -2013, Organized by Materials Research Society of India (Kolkata chapter), 28<sup>th</sup> August, 2013, Jadavpur University, Kolkata, India (Best paper Award).
13. T. Acharya, S. Mandal, and S.P. Maity, "Joint Power and Channel Allocation for Outage Probability Minimization in Cognitive Radio Ad Hoc Networks," in the Fifth International Conference on Communication Systems and Networks (COMSNETS), Bangalore, India, 2013 (Acceptance ratio 26.5%).
14. Mousumi Bhanja, Kasturi Ghosh and Baidyanath Ray: Design of Multifunction biquad function structure using OTA, IEEE Int. Conf. On Computers and Devices and Communication (CODEC), 17-19 Dec. 2013, Kolkata
15. Ankita Pramanik, G. Patil and L. Borman, "New 0.86 rate Quasi-Cyclic LDPC code for radio application," International Conference on Information Technology, Electronics and Communications, 2013, Hyderabad, India.
16. Ankita Pramanik, G. Patil and L. Borman, "Small length Quasi-Cyclic LDPC code for wireless applications," IEEE Annual International Conference on Emerging Research Areas, 2013, Kottayam, India.
17. Chakraborty, Ankita Pramanik and Rekha A. B., "Study of RTK performance of GNSS receivers under various Satellite tracking and frequency of operations," IEEE Annual International Conference on Emerging Research Areas, 2013, Kottayam, India.
18. S. Rathore, Ankita Pramanik and K. J. Prasad, "Binary offset carrier modulation" for wireless radio communication," International Conference on Electronics and Communication Engineering, 2013, Bangalore, India.
19. Ankita Pramanik, G. Patil and L. Borman, "New High Rate LDPC codes for radio applications," IEEE International Conference on Advanced Computing Technologies 2013, Rajampet, India.

20. Ankita Pramanik, G. Patil and L. Borman, "Small length DVB-S2 type LDPC Codes," International Conference on Technical and Managerial Innovation in Computing and Communications in Industry and Academia, 2013, Kolkata, India.
21. Pragadeeswaran, Ankita Pramanik and L. Borman, "Binary Offset Carrier Modulation for a 38.4 kbps Radio," IEEE sponsored International Conference on Emerging Trends in Communication, Control, Signal Processing and Computing Applications, 2013, Bangalore, India.
22. S.Ghosal and S.R.Bhadra Chaudhuri "Analysis of a rectangular slot in a microstrip patch antenna with an equivalent circuit model", IEEE-AEMC-2013, December, Bhubaneswar, India
23. S.Basu Pal, S.Bijali, S.R.Bhadra Chaudhuri, D. Mukherjee "Modelling Solar PV Behavior using the Interpolation Approach for Climatic Conditions of Eastern India", ICES-2013, Beijing, China. November, 2013.
24. S.Basu Pal, S.R.Bhadra Chaudhuri, D.Mukherjee "A comparative examination of Relative Power Losses in PV strings: An Indian experience", IEEE sponsored PVSEC-23, Taipei, Taiwan, October, 2013.
25. Pratik Mondal, and **S. K. Parui** "Design of a compact Bandpass Filter using Multimode Resonators for Ultra-Wideband Application with WLAN band notch", International workshop on Antenna Technology (iWAT2013), Karlshue, Germany, pp.67-70, March 2013
26. Ayan Chatterjee, Susanta Kumar Parui, "A Multi-Layered Band-Pass Frequency Selective Surface Designed for Ku Band Applications", IEEE Applied Electromagnetics Conference, Bhubaneswar, India, December 18-20, 2013.
27. Bappaditya Mandal, Bhupesh Mukherjee, Ayan Chatterjee, Susanta Kr. Parui, "Design of Printed Body Wearable Textile Antenna for Broadband Application", IEEE Applied Electromagnetics Conference, Bhubaneswar, India, December 18-20, 2013
28. Bhupesh Mukherjee, Bappaditya Mandal, Susanta Kr. Parui, Santanu Das, "Coplanar Waveguide Fed Wide Band Modified Rectangular Slot Antenna for UWB Application", IEEE Applied Electromagnetics Conference, Bhubaneswar, India, December 18-20, 2013
29. Biswarup Rana, and **Susanta Kumar Parui**, "Design Of SIW Series fed Cylindrical Dielectric Resonator Linear Array Antenna" IEEE International Symposium on Phased Array Systems & Technology, Waltham, Massachusetts, USA October, 2013
30. Ayan Chatterjee, **Susanta Kumar Parui**, "A Multi-layered Broadband Frequency Selective Surface for X and Ku band Applications", International Conference on Technical and Managerial Innovation in Computing and Communications in Industry and Academia (IEMCON), Kolkata, India, pp. 284-287, August 23-24, 2013
31. Biswarup Rana, Chandan Kumar Ghosh and **Susanta Kumar Parui**, "Design of Dielectric Resonator Loaded Slot Antenna", IEEE Indian Antenna Week: A workshop on Advanced Antenna Technology, Aurangabad, IAW 2013, pp.218-22, June, 2013
32. Chandan Kumar Ghosh and **Susanta Kumar Parui**, "Reduction of Mutual Coupling between E-Shaped Microstrip Antenna Array by Using a Simple Microstrip I-Section", IEEE Indian Antenna Week: A workshop on Advanced Antenna Technology, Aurangabad, IAW, pp.218-22, June, 2013
33. Biswarup Rana, and Susanta Kumar Parui, "Substrate Integrated Waveguide Fed Cylindrical Dielectric Resonator Antenna Array", Annual conference of Antenna test and measurement society, India, Kolkata, ATMS-2013, pp.218-22, February, 2013



## ***Department of Earth Sciences***



## The Department

Indian Institute of Engineering Science and Technology, Shibpur (Formerly Bengal Engineering and Science University, Shibpur) and the subject Geology possess a century old relationship. Many eminent geoscientists have offered their teaching and research expertise in the past. Previously teaching in geology was introduced in this university to meet the need of the would be engineering graduates only in Civil Engineering, Mining Engineering and Metallurgical Engineering branches. The science streams have emerged as an integral part of the university offering postgraduate degrees from 2001. The Department of Geology, however, has started to offer independent postgraduate courses in geology after its separate identity as a science department from 2005. In 2011, name of the department has been changed to the Department of Earth Sciences to hold an umbrella to develop teaching and research in various disciplines of geology, geophysics, atmospheric and planetary sciences.

The Department of Earth Sciences is dedicated to improve the understanding of the solid earth, its geotechnical and other applied aspects through teaching, research and field training programme. Students are being trained by permanent and eminent visiting faculties of diverse fields of geology, involved in frontier areas of research like sedimentology, basin tectonics, mineralogy, geochronology, tectonothermal evolution, hydrogeology and paleontology etc. The Master degree programme of the department has a modern and updated syllabus to cope up with the need of the hour and aims to prepare students for a broad range of geoscientific careers which includes petroleum or mineral exploration, natural hazard mitigation and geoscientific activities in different universities and research institutes. Students are able to find employment in mining companies, petroleum industries and various corporate houses.

### Academic Programmes:

#### Postgraduate Level

|  |  |
|--|--|
| i. Degree offered  | M.Sc In Applied Geology.   |
| ii. Sanctioned students' intake                            | 25   |
| iii. Additional intake through other programmes (i.e. QIP) | NIL  |
| iv. Specialisations in                                     | Sedimentology & Basin Tectonics,<br>Paleontology (Invertebrate), Geohydrology. |

#### Doctoral Level

|                               |                           |
|-------------------------------|---------------------------|
| i. Degree offered             | Ph.D in Science (Geology) |
| ii. No of candidates enrolled | 0                         |
| registered                    | 04                        |
| awarded                       | 0                         |



**Faculty position:**

Sanctioned faculty post : 8 (Professor-01, Associate Professor-03, Assistant Professor-04)

Vacant Post : Assistant Professor-03, Associate Professor-02.

**Faculty profile**

| Name                           | Designation                 | Highest Qualification | Specialisation/<br>Research Area | Contact No.<br>E-mail                                    |
|--------------------------------|-----------------------------|-----------------------|----------------------------------|--|
| Dr.Bhabani Prasad Mukhopadhyay | Professor                   | Ph.D.                 | Sedimentology & Basin Tectonics  | +91-9830019506.<br>+919433053978<br>bpmbesus@gmail.com   |
| Dr.Tapas Ganguly               | Associate Professor (WBHES) | Ph.D.                 | Invertebrate Paleontology        | +91-9903570914<br>tapasgeolbe@yahoo.com                  |
| Dr.Ananya Biswas               | Associate Professor         | Ph.D.                 | Sedimentology & Stratigraphy     | +91-9830012606<br>+919433516731<br>anniegeol@hotmail.com |

**Research area** (only broad titles):

Sedimentology, Basin Tectonics, Geohydrology, Invertebrate Paleontology.

**Research facilities:** (name specific equipment / picture etc.)

Binocular Microscope with photographic attachments, GPS, Petrological microscope (student model), Rock cutter, rock polishing machine, Hotplate, Spectrophotometer, ph meter & conductivity meter

**Name of the laboratories:**

- 1.Sedimentology
- 2.Paleontology
- 3.Rock cutting & polishing

**Support staff position:**

Sanctioned technical post: 01

**Sponsored Research:** (only areas mentioned)

| Ongoing (Prof value)         | Sponsoring agency  | Principal Investigator             |
|------------------------------|--|------------------------------------|
| Sedimentology-Rs /-20,58,500 | ONGC (Completed in 2014)                                 | Prof. Bhabani Prasad Mukhopadhyay. |
| Sedimentology-Rs /-21,16,000 | DST (Completed in 2014)                                  | Prof. Bhabani Prasad Mukhopadhyay  |
| Hydrogeology-Rs.16,11,600.00 | Govt. of W.B.  | Prof. Bhabani Prasad Mukhopadhyay  |
| Hydrogeology-Rs.22,22,000.00 | West Bengal Power Development Corporation Ltd. (WBPDCCL) | Prof. Bhabani Prasad Mukhopadhyay  |

**Department received DST-FIST support under FIST-2009 – Rs. 40.75 Lakhs.—Continuing till 2015(March)**

**Industry- Institute Interaction**

1. Department is collaborating with ONGC for drill-site training of students & research work.

2. Department collaborating with different opencast and underground mining companies for training of the postgraduate students.

Faculty members are carrying out different research projects funded by the industrial organizations like ONGC, WBPDCCL (mentioned in the “Sponsored Projects”).

**No of publications:**

**Journal** -3 (published)

Conference- 2-National & 1-International

Books/Monographs- 0

(List to be included)

**List of Publications (2013-14)**

Biswas, A, Mukhopadhyay, B.P, Banerjee, T, Mazumdar, P, Thorie, A. 2014. Sedimentation Modelling as a proxy tool for reconstruction of a Falling Stage System Tract on a Proterozoic Carbonate Ramp: Evidence from Simla Group, Western Lesser Himalaya, India. 19th International Sedimentological Congress (ISC 2014), Geneva, Switzerland, August 2014.

Mazumdar, P, Mukhopadhyay B.P., Biswas, A., Banerjee, T., Thorie, A. 2014. Signature of palaeoseismicity recorded from the rock strata of the Chhaosa Formation, Simla Group, Himachal Himalaya, India. National Conference on Sedimentation and Stratigraphy & 31<sup>st</sup> Convention of Indian Association of Sedimentologists-2014.

Banerjee, T., Biswas, A., Mukhopadhyay B.P., Thorie,A, Mazumdar, P. Facies architecture and sequence stratigraphy of a mid-outer ramp carbonate succession: Basantpur Formation, Proterozoic Simla Group, Western Lesser Himalaya, India. National Conference on

Thorie, A, Biswas, A., Mukhopadhyay B.P., Banerjee, T., Mazumdar, P. 2014. Control of microbial mat related structures (MRS) on mixed siliciclastic-carbonate platform from Lower Proterozoic Simla Basin (Basantpur Formation), Lesser Himalaya, Simla district, Himachal Pradesh, India. National Conference on Sedimentation and Stratigraphy & 31<sup>st</sup> Convention of Indian Association of Sedimentologists-2014.

Mukhopadhyay B.P., Biswas, A., Thorie,A. 2013. Signatures of deep marine deposits in the upper part of the Delhi Supergroup, Proterozoic Alwar sub-basin, Rajasthan. National Conference on Sedimentation and Tectonics with Special Reference to Energy Resources of North-East India & 30<sup>th</sup> Convention of Indian Association of Sedimentologists, 2013.

Mukhopadhyay B.P., Biswas, A., Banerjee, T. 2013. Siliciclastic-carbonate sedimentation in a storm-tide influenced Proterozoic fan-delta system, Lower Simla Group, Himachal Himalaya, India. National Conference on Sedimentation and Tectonics with Special Reference to Energy Resources of North-East India & 30<sup>th</sup> Convention of Indian Association of Sedimentologists, 2013.

Biswas, A., Mukhopadhyay B.P., Mazumdar, P. 2013. Signature of a Proterozoic fan-delta system, Middle-Upper Simla basin, Himachal Pradesh, India. National Conference on Sedimentation and Tectonics with Special Reference to Energy Resources of North-East India & 30<sup>th</sup> Convention of Indian Association of Sedimentologists, 2013.

***Department of  
Humanities and Social Sciences***



## About the department

From a fledgling existence in the mid-twentieth century, the department has grown-up substantially in the last two decades. The much sought after analytical, exploratory and soft-skill development for engineering is being met with regular ease and innovation. Moreover, the extremely necessary societal, cultural, economic, ethical and organizational inputs are now provided within a composite perspective of global experiences and local roots. The department has become a customary hot-spot for international collaboration in last two years.

### Academic Programmes:

#### Undergraduate level

- I. Degree offered: None in its own domain
- II. Sanctioned student intake: Nil in its own domain
- III. Additional intake through lateral entry: Nil

However, the department in a comprehensive manner teaches five different subjects to all the under-graduate students of engineering spread over the present eight semester (B.E. ) format.

|   | Name of Subjects                       | Semesters |
|---|--|-----------|
| 1 | Professional Communication in English. | 1 & 2     |
| 2 | Industrial Sociology                   | 3 & 4     |
| 3 | Marketing Management                   | 3 & 4     |
| 4 | Economics                              | 5 & 6     |
| 5 | Finance & Accounts                     | 7 & 8     |
|   |  |           |

The department offers several **Elective Courses** to 8<sup>th</sup> Semester B. E. Students

The department also teaches **English For Engineers** to 1<sup>st</sup> Semester B.Arch students

#### Post Graduate Level:

- I. Degree offered: Nil in its own domain. But, the department acts as a principal facilitator in the MBA programme. The department also has plans to start its own P. G. Programme in near future if all round adequate support is provided.
- II. Sanctioned student intake: Nil
- III. Additional intake: Nil
- IV. Specialisations available: English, Economics, Management, Finance and Accounts, Environment, Sociology, Gender studies.

#### Doctoral and post doctoral Research programme:

- I. Degree offered: PhD in Humanities, Social and Management Sciences
- II. Number of candidates enrolled:
- III. Number of candidates registered: -- 3
- IV. Number of candidates awarded: -- 4

**Faculty Position:**

Sanctioned faculty post.....5..... Vacant post.....3.....

**Faculty profile**

| Name                       | Designation                | Highest Qualification   | Specialisation/Research Area                   | Contact No. E-Mail                       |
|----------------------------|----------------------------|-------------------------|--|--|
| Madhumati Dutta            | Professor & Dean, FSMS     | PhD                     | Environmental Economics / Management           | 9836853402<br>madhumatidutta@yahoo.co.in |
| Mallika Ghosh Sarbadhikary | Associate Professor & Head | M. Phil                 | Renaissance Studies, Gender Studies, ELT       | 9830296095<br>ghosh16mallika@gmail.com   |
| Partha Sarathy Roy         | Associate Professor        | PGDM (XLRI)<br>PhD Mgmt | Marketing Management                           | 9432257559<br>psroy740@rediffmail.com    |
| Rupen Basu Mallik          | Associate Professor        | M.Com,<br>ICWA          | Accounting & Financial Management              | 9831313642<br>rbmallik@gmail.com         |
| Subhasis Bandyopadhyay     | Assistant Professor        | M.A. UGC-NET            | Sociology of Industry, Organization and Labour | +91 9836945013<br>subhasisban@gmail.com  |

**Awards and Laurels received by the faculty members:**

**Research area (broad titles):** Environmental Economics; Climate Change and Consumer Behaviour in India ; Financial Accounting and Management; Renaissance Studies; Marketing Management and Entrepreneurship; Gender Studies; S&T Policy Studies; Political Economy of Climate.

**Research Facilities:** GPS –reader (hand held); SPSS; SYSTAT; Photocopier.

**Name of the Laboratories:** Language lab (proposed)

**Support Staff position:**

- i) Sanctioned technical post....Nil
- ii) Sanctioned non-technical posts ....Two (2) Group-D

**Details of publication of each faculty members (2013-14)****Journal:****Conference:**

Ghosh Sarbadhikary Mallika. “The Indian Fox : An Indian Adaptation of Volpone Considered “ abstract published in Conference proceedings of ISTR conference, 2014 and full paper accepted for publication in the book *Natyashashtra*.

**Books/Monographs**

Book chapters: 1. Bandyopadhyay Subhasis. *The Chimera of Development: A Conceptual Critique* in A Mazumder *et al (eds.)* Human Development – Perspective and Dimensions. Silchar: RPCWC 2013 Pp. 35-46 (ISBN: 978-81-925997-0-0)

Dutta Madhumati. “Contingent Valuation of Environment in Developing Regions” in Academia : GMGC, Volume 1, Issue 1, 2014-15, pages 158-168, ISSN 2348-7054 (with Sanchita Sen).

Dutta Madhumati. “Targeting Consumer Groups and What They Consume for the Mitigation of Climate Change in India”, in Mohamed Behnassi and Katriona McGlade (eds.),

Environmental Change and Human Security, accepted for publication, 2014-15, Springer

Dutta Madhumati. “Evolving Feasible Modal Structures for Cost Efficient Pollution Reduction: The case of Passenger Transport in an Indian megacity”, in Michael von Hauff and Amitabh Kundu (eds.), Economic Studies on Asia, edited by Carsten Hermann-Pillath, Werner Pascha, Gunter Schucher, Cornelia Storz, Markus Taube and Michael von Hauff, Metropolis-Verlag, Marburg, 2013 (with Joysankar Bhattacharya), 179 – 202.

**Seminar/Workshop/Conference/Training programme organized by the department  
(2013-14)**

|   |   |                              |
|---|---|------------------------------|
| 1 | National Seminar : Women & Work: Issues & Interrogation.  | February 17, 2013            |
| 2 | Symposium, Environmental Action in West Bengal  | February 19, 2014            |
| 3 | Short Term Course : Environment : An Interdisciplinary Approach   | February 19 – March 15, 2014 |
| 4 | Higher Education in the Time of Crisis, Talk by Prof. Alan Spector, Professor, Purdue University  | March 8 <sup>th</sup> , 2014 |
| 5 | Inspiring Change: Equality for Women is Progress for All. Women's Day Celebrations accompanied by AV presentations  | March 8 <sup>th</sup> , 2014 |
| 6 | Legacies: A lecture series on the History of Science and Technology<br>*infinitesimal in calculus by Prof. Gautam Bandopadhyay ( May 20, 2014 )<br><br>*Music of Primes Prof.Asok Mallik ( Aug 13, 2014 ) | May, 2014 and continuing     |
| 7 |   |                              |
| 8 | Symposium (jointly with Dept. of IT ) on Philosophy of Science,   | August , 2013                |
| 9 | Short Term Course : Research Methodology  | Nov 18 – 23, 2013            |

**Advancement under TEQIP – Phase II: ( No TEQIP Fund received )**

**Foreign visit and invited Lectures:**

**Mallika Ghosh Sarbadhikary:** Delivered a series of invited lectures at Maulana Azad College, Kolkata on *Renaissance Drama*. (September-December, 2013)

**Subhasis Bandopadhyay:** Delivered invited lectures at

# UGC Academic College for Short Term course in association with Dept. of Education, Calcutta University on *A Journey Through Content Analysis: An Interpretative Understanding* (March 3, 2014 )

# Asutosh College, Kolkata- *Applied Sociology : A Critical Review* (September, 2014)

**Visitors to your department:**

Professor Manasendu Kundu, University of California at Santa Barbara, February, 2014  
Professor Alan J. Spector, Purdue University, March 2014

**Training and Placement:** Introduced Participatory Discourse Development (PDD) in class room pedagogy that would benefit students finally in their placement procedure.  
Coordinating Communicative English course in collaboration with British council, Kolkata

**Extension Activities and Societal outreach:** Conceived and initiated the formation of Internal Complaints Committee (ICC) as per the Visakha guide lines of Supreme Court to redress sexual harassment of women at work place and initiated gender sensitization programmes.



**New Academic/Research initiative:**

**Proposed new areas of teaching and research**

|   |   |
|---|---|
| 1 | Centre for Studies in Society, Science & Technology |
| 2 | Centre for Policy Research                          |
| 3 | Centre for Environment Studies                      |
| 4 | Centre for Gender Studies                           |
| 5 | Centre for Arts & Aesthetics                        |
| 6 | Centre for Soft Skills                              |

**Introduction of numerous short certificate courses for under graduate students are going to start from November 2014 itself in association with expert from UCSB. The following are some of the proposed courses:**

- Human Evolution and Development of Technology since Antiquity
- Past, Present and Future of our Food
- Environmental Philosophy & Ethics
- World Population Growth: Concerns & Debates
- Science & Technology in Bengali Literature
- Ancient Civilizations

***Department of  
Information Technology***



## Introduction

The Department of Information Technology started its journey in the year 2000. It is one of the youngest departments of this 158 years old Institute. The department has produced excellent IT engineers who are serving in different reputed organizations and pursuing higher studies at Institutes of Excellence in India and abroad. The department provides state of the art computational facilities for the students. The strength of the department has been in its diverse areas of research in which it has a remarkable contribution.

## Academic Programmes

### Undergraduate Level

***B.E. in Information Technology:*** The B.E. program is a four-year course oriented undergraduate program. The course work is spread across all the semesters. The courses include a set of core courses offered by the department, a set of departmental electives and some free electives. Apart from these, a student must complete three courses in his / her minor area. The minor area must be different from Information Technology. Besides, a student must also complete a project in fourth year (7<sup>th</sup> – 8<sup>th</sup> semester) towards the fulfillment of the degree requirements.

### Postgraduate Level

***M.E. in Information and Communication Engineering:*** The M.E. program is a two-year course oriented graduate program. The student has to take a set of core courses and a set of electives. The course work is spread across the first two semesters with an option of taking one elective in the third semester. This is followed by a project in the third and fourth semester in which the student can take up a project of his / her interest, supervised by a faculty member.

### Doctoral Level

***PhD in Information Technology:*** The PhD. programs are postgraduate research oriented programs. The scholar works in an area of his/her interest under the supervision of a faculty member. The scholar has to obtain a minimum number of credits by taking courses. The highlight of the program is the independent research work taken by a scholar, leading to a dissertation at the end of the program. The average duration of a PhD. program is between four to five years.

### Student's intake

|  | U.G | P.G | Ph.D (Session 2013-14)                              |
|--|-----|-----|---|
| Sanctioned students' intake                  | 60  | 20  | 1- Awarded<br>5- Thesis submitted<br>11- Registered |
| Additional intake through lateral entry/ QIP | 6   | -   | 6- Enrolled   |

## Ph.D Activities

### Ph.D Awarded during 2013-2014 session

1. **Debasis Mitra** : *Studies in High-throughput and Reliable Assay Operations on Digital Microfluidic Biochips.*

### Ph.D Submitted during 2013-2014 session

1. **Indrajit Pan** : *Design and Analysis of Droplet Routing Algorithms for Digital Microfluidic biochip.*
2. **Indrajit Banerjee**: *Application of Cellular Automata for Sensor Network Management.*
3. **Kamalika Dutta**: *Synthesis and Optimization of Reversible Logic Circuits.*
4. **Subarna Chatterjee**: *Computer Aided Breast Cancer Diagnosis Systems for Sono-mammogram.*
5. **Mousumi Dutta**: *Generation Decomposition and Analysis of the Isothetic Polygons in the Digital Geometric Paradigm.*

### PhD. Registered during 2013-2014 session

1. Prasenjit Chanak
2. Rupam Bhattacharya
3. Partha pratim Saha
4. Raju Hazari
5. Subhankar Chatterjee
6. Sudeshna Silkar
7. Arijit Sarkar
8. Anirban Bose
9. Suman Bhowmik
10. Apurba Roy
11. Nazma

### Ph.D Enrolled during 2013-2014 session

1. Pampa Howladar
2. Mayukh Sarkar
3. Debashri Roy
4. Sukanya Mukherjee
5. Utpal Mondal
6. Anupam Pattanayak
7. Nimisha Ghosh
8. Rupam Som
9. Shuvajyoti Datta
10. Rafiul Islam
11. Tapashi Bhattacharya
12. Ranjeet Rout

## Faculty position

| Faculties                    | Nos. |
|------------------------------|------|
| Sanctioned faculty post      | 13   |
| Professor                    | 2    |
| Associate Professor          | 1    |
| Assistant Professor (Senior) | 1    |
| Sanctioned faculty post      | 7    |
| Professor                    | 2    |
| Vacant post                  | 2    |

| Faculty Name                  | Designation | Highest Qualification | Specialization/ Research Area  | Contact No. / Mail Id  |
|-------------------------------|-------------|-----------------------|--|--|
| <b>Dr. Hafizur Rahaman</b>    | Professor   | Ph.D                  | <ul style="list-style-type: none"> <li>➤ Design &amp; Test of VLSI Circuits</li> <li>➤ Network-On-Chip</li> <li>➤ SOC Testing</li> <li>➤ Design &amp; Testing of Cryptographic Hardware</li> <li>➤ Design &amp; Testing of Micro fluidic Bio Chip</li> </ul>   | <a href="mailto:rahaman_h@it.iiest.ac.in">rahaman_h@it.iiest.ac.in</a>     |
| <b>Dr. Santi Prasad Maity</b> | Professor   | Ph.D                  | <ul style="list-style-type: none"> <li>➤ Digital Image Watermarking</li> <li>➤ Wavelets for image de-noising, watermarking, Access control and Error concealment</li> <li>➤ Optimized spread Spectrum watermarking</li> <li>➤ VLSI for watermarking</li> <li>➤ PAPR reduction in multicarrier communication</li> <li>➤ Wireless Channel Estimation</li> <li>➤ Multiuser Detection in MC-CDMA</li> <li>➤ Optical Computing</li> </ul> | <a href="mailto:santipmaity@it.iiest.ac.in">santipmaity@it.iiest.ac.in</a> |

|                                |                     |        |  |   |
|--------------------------------|---------------------|--------|--|---|
| <b>Dr. Arindam Biswas</b>      | Associate Professor | Ph.D   | <ul style="list-style-type: none"> <li>➤ Digital Geometry</li> <li>➤ Image Processing and Pattern Recognition</li> <li>➤ Medical Image Analysis</li> </ul>   | <a href="mailto:abiswas@it.iist.ac.in">abiswas@it.iist.ac.in</a><br>barindam@gmail.com<br>Extn. no. 260 |
| <b>Dr. Sukanta Das</b>         | Assistant Professor | Ph.D   | <ul style="list-style-type: none"> <li>➤ Cellular Automata</li> <li>➤ Distributed Computing</li> </ul>   | <a href="mailto:sukanta@it.iist.ac.in">sukanta@it.iist.ac.in</a><br>Extn. no.                           |
| <b>Dr. Tuhina Samanta</b>      | Assistant Professor | Ph.D   | <ul style="list-style-type: none"> <li>➤ Design of algorithms for VLSI inter connect design</li> <li>➤ Developing of algorithm for Physical design of Digital Micro-fluidic Biochip</li> </ul>   | t_samanta@it.iist.ac.in   |
| <b>Dr. Prasun Ghosal</b>       | Assistant Professor | Ph.D   | <ul style="list-style-type: none"> <li>➤ Optimization of Architectural and Layout Level Design of 3D Nanoscale Systems with major thrust on a) Performance Centric, Power Aware Design of Network-on-Chips(NoC) and b) Performance Centric Layout Design of 3D Integrated Circuits</li> <li>➤ Post Silicon Nanoscale Technologies and Computing</li> </ul> | p_ghosal@it.iist.ac.in  |
| <b>Dr. Indrajit Banerjee</b>   | Assistant Professor | Ph.D   | <ul style="list-style-type: none"> <li>➤ Wireless ad-hoc Sensor Network</li> </ul>   | ibanerjee@it.iist.ac.in   |
| <b>Mr. Surajit Kr. Roy</b>     | Assistant Professor | M.Tech | <ul style="list-style-type: none"> <li>➤ VLSI Testing</li> <li>➤ 3DIC Testing</li> </ul>   | suraroy@gmail.com   |
| <b>Dr. Chandan Giri</b>        | Assistant Professor | Ph.D   | <ul style="list-style-type: none"> <li>➤ VLSI digital Circuit Testing</li> <li>➤ System-On-Chip Testing</li> <li>➤ Network-On-Chip Testing</li> </ul>  | chandangiri@gmail.com   |
| <b>Mr. Shyamalendu Kandar</b>  | Assistant Professor | M.Tech | <ul style="list-style-type: none"> <li>➤ Secret Sharing, Visual Cryptography</li> </ul>  | shyamalendk@it.iist.ac.in   |
| <b>Dr. Malay Bhattacharyya</b> | Assistant Professor | PhD    | <ul style="list-style-type: none"> <li>➤ Crowdsourcing</li> <li>➤ Big Data Analysis</li> <li>➤ Computational Molecular Biology</li> </ul>  | <a href="mailto:malaybhattacharyya@it.iist.ac.in">malaybhattacharyya@it.iist.ac.in</a>                  |

## Awards and Laurels

| Name                   | Award Received  | Given by   | Year           |
|------------------------|---|--|----------------|
| <i>Hafizur Rahaman</i> | DST-DAAD research fellowship (with Prof. Rolf Drechsler, Professor and Director, Computer Architecture Group, University of Bremen, Germany).           | <i>Indo-German (DST-DAAD) Bilateral Cooperation</i>      | 2013-2015      |
| Dr. Sukanta Das        | Career Award for Young Teachers (CAYT) Development of Automata Model for Distributed Systems  | AICTE  | 2013           |
| Dr. Prasun Ghosal      | Vice Chair, Executive Committee of IEEE computer Society (IEEE CS) Technical Committee on VLSI(TCVLSI)  | ELSEVIER   | 2014           |
|                        | Awarded Outstanding Reviewer status by ELSEVIER   | ELSEVIER   | 2014           |
|                        | Heidelberg Laureate Forum Fellowship from Heidelberg Laureate Fellowship Foundation to participate in the 1st Heidelberg Laureate Forum to be held from | Heidelberg Laureate Forum Fellowship Foundation, Germany | September 2013 |
|                        | Senior Member Grade from ACM  | Association of Computing Machinery                       | 2013           |
|                        | Raman Fellowship for Post Doctoral Research (one year) for Indian Scholars in United States for the   | University Grants Commission, India.                     | 2013           |
| Dr. Tuhina Samanta     | Raman Fellowship for Post Doctoral Research (one year) for Indian Scholars in United States for the   | University Grants Commission, India.                     | 2013           |



## Research area

Below we mention the selected areas of research contributions in made by the department.

- A. Systems Architecture and Design of Computer  
Architecture, Design,  
Testing,  
Verification,  
Algorithms  
and VLSI  
CAD
- B. Theory and Applications of Cellular Automata  
in Distributed Computing,  
Pattern Recognition,  
Traffic Modeling  
and  
VLSI design & Test
- C. Digital Image Watermarking and Signal Processing  
LBM and Additive watermarking using signal processing tools  
High Payload Spread Spectrum watermarking using Wavelets  
QIM watermarking for Access control and Error Concealment  
Optimized Spread Spectrum watermarking  
VLSI architecture for watermarking
- D. Digital Geometry and Image Analysis  
Shape Analysis  
3D Image Analysis  
Face Recognition  
Document Image Analysis
- E. Wireless and Mobile Communication, Sensor Network  
PAPR reduction in Multicarrier System  
Multiuser Detection in MC-CDMA  
Channel estimation  
Optimized system design  
Efficient Routing protocol  
Energy efficient WSN Management
- F. Nanoscale Computing and system Design  
Optimization of Architectural and Layout Level Design of 3D Nanoscale Systems  
with major thrust on
  - Performance-centric, Power Aware Design of networks-on-Chips (NoC) and
  - Performance Centric Layout Design of 3D Integrated CircuitsPost Silicon Nanoscale Technologies and Computing
  - Memristive Technology, Modeling, and Simulation
  - DNA Computing

**Research facilities****Computing Facilities:**

| <b>Model</b>   | <b>Specification</b>  | <b>Nos.</b> |
|--|---|-------------|
| <b>A. MAIL SERVER<br/>&amp;<br/>FILE SERVER</b>                                    | X Series 236 @ server (IBM )<br>Intel Single Xeon DP Processor @ 3.2 GHz<br>EM 64T  | 2           |
| <b>B. SUN SERVER</b>   | SUN FIRE V215 SERVER<br>PROCESSOR 2X ULTRA SPARC 111  | 1           |
| <b>C. ORACLE SERVER</b>  | Single or Dual Intel® Xeon® 3.0 GHz<br>processors or Single or Dual Intel® Xeon®<br>3.2 GHz processors (dependent on model) | 1           |
| <b>D. HP XW 4600Workstation</b>  | Intel Dual Core 3 GHZ   | 2           |
|  | I3 RAM 4GB Hard Disk 1TB  | 20          |
| <b>E. HP COMPAQ DX 7200<br/>MICROTOWER &amp;<br/>DELL OPTIPLEX 780<br/>Desktop</b> | INTEL P-IV HT 3 GHZ & CORE DUO<br>2.80 GHZ<br>2GB DDR2 RAM  | 180         |
| <b>F. HP Compaq dx7400<br/>MICROTOWER</b>  | INTEL CORE 2 DUO 1.60 GHZ<br>1 GB DDR2 RAM  |             |
| <b>G. HP COMPAQ DX 7200<br/>MICROTOWER</b>   | INTEL P-IV HT 3 GHZ   |             |

**Software:**

- Windows 98 (SE)
  - Red Hat Linux 703 professional
  - Norton systems works
  - Personal oracle 8015 (Win 98 compatible)
  - Visual studio .Net professional (Single user)
  - MS office XP (Prof)
  - Macromedia flash
  - ADOBE Photoshop CS2 version 9 educational paper license
  - ADOBE Photoshop CS2 version 9 Edu media kit on CD
  - Windows 2000 (OEM Pack)
  - Win 2000 server plus (Academic editions) Client license
  - Oracle 10G database std-I edition on linux
  - McAfee Active Virus Scan P:1 Gold (101 user)
  - Adobe Acrobat Professional 9
  - Extra Cyber Emulator
- 
- Matlab R2008a (Client Server) (30 user)
  - Simulink (5 user)
  - Signal Processing Toolbox(5 user)
  - ATS for oracle std-I for 1 year
  - Media for oracle in CD
  - Internet developer suite on windows XP OS
  - Sound forge (latest version) Edu full box on CD
  - Rational Rose
  - Microsoft windows XP prof. Upgrade OLP NL-AE
  - Microsoft office 2003 prof. OLP NL-AE
  - Microsoft studio 8 Edu paper license
  - Microsoft windows XP prof. Media kit on CD
  - Microsoft office 2003 prof. Media kit on CD
  - Microsoft studio 8 Edu media kit on CD
  - 1SE Design Suite Foundation 8.1i,9.1i,10.1i,11.1i, 12.1i, 13.1i
  - Chip scope Pro
  - Embedded Development kit
  - Plan Ahead
  - System Generator
  - Accel DSP
  - ModelSim XE Simulator

**Electronics Equipment:**

| Sl. No. | Name of the Item  | Qty |
|---------|---|-----|
| 1       | Microcontroller Kit SDA 51  | 12  |
| 2       | P-N Sequence generator  | 04  |
| 3       | Function Generator  | 09  |
| 4       | Test ROM for NIFC- 27   | 01  |
| 5       | 26 pin I/O connector  | 15  |
| 6       | PMS DSP 320C 30Trainer KIT  | 06  |
| 7       | Parallel Port Cable for DSP C-30  | 06  |
| 8       | Input /Output Cable   | 06  |
| 9       | Power Supply for SDA –51  | 12  |
| 10      | 8085 Microprocessor Trainer kit   | 18  |
| 11      | 8086 Microprocessor Trainer kit   | 06  |
| 12      | Digital Trainer kit   | 08  |
| 13      | Digital Communication Trainer kit   | 15  |
| 14      | Traffic Light simulator Interface Kit (ALS -NIFC-11)                                      | 06  |
| 15      | DAC for ADC Temperature Sensor Dual slope ADC interface for $\mu$ P trainers(ALS-NIFC-10) | 04  |
| 16      | Interface to study A/D and D/A converter(NIFC-27)   | 02  |
| 17      | JP6 of Interface card to Trainer Kit Connector  | 02  |
| 18      | Test ROM for NIFC- 01and NIFC-11  | 01  |
| 19      | CROSS COMPILER FOR DSP  | 01  |
| 20      | DIGITAL STORAGE OSCILLOSCOPE  | 01  |
| 21      | CATHODE RAY OSCILLOSCOPE  | 11  |
| 22      | SPECTRUM ANALYZER   | 01  |
| 23      | Vector Signal Generator   | 01  |
| 24      | Spartan-3 AN FPGA Development Board   | 05  |
| 25      | Spartan-3 FPGA Development Board  | 01  |
| 26      | Virtex-5 FPGA Development Board   | 02  |
| 27      | Vector Signal Analyzer  | 01  |
| 29      | Agilent N5182A-403 Calibrated AWGN  | 01  |

**Name of the Laboratories:**

| Laboratory description in the curriculum | Exclusive use / shared | Number of students | Number of experiments | Quality of instruments                                      | Laboratory manuals   |
|--|------------------------|--------------------|-----------------------|---|--|
| Computer Lab-I                           | Exclusive              | 66                 | 40 / semester         | All computers in the laboratory have dual core and core2Duo | Manuals for the laboratory instructions are uploaded on the website. |
| Computer Lab-II                          | Exclusive              | 66                 | 40 / semester         | All computers in the laboratory have P4 configuration       | Manuals for the laboratory instructions are uploaded on the website. |
| Computer Lab-III                         | Exclusive              | 40                 |                       |   |  |
| Computer Lab-IV                          | Exclusive              | 50                 |                       |   |  |

|   |           |    |  |   |  |
|---|-----------|----|--|---|--|
| ME Lab I                                | Exclusive | 10 | 9 / semester<br>Used for<br>research<br>related<br>works | All computers<br>in the<br>laboratory<br>have Intel i5<br>configuration |  |
| ME Lab II                               | Exclusive | 10 | 9 / semester<br>Used for<br>research<br>related<br>works |   |  |
| Electronics and<br>Communication<br>Lab | Exclusive | 30 | 25   | Instruments   |  |
| Research Lab                            | Exclusive | 10 |  |   |  |

**Support staff position:**

- i) Sanctioned technical post:
- ii) Technical staff profile

| TECHNICAL ASSISTANT   |                     |                                       |            |                            |
|-----------------------|---------------------|---------------------------------------|------------|----------------------------|
| Name                  | Designation         | Highest Qualification                 | Contact No | E-mail Id                  |
| Soma Sardar           | Technical Assistant | D.C.S.T, MCA, M.TECH                  | 9433487298 | somabeit@gmail.com         |
| Soumen Gope           | Technical Assistant | D.C.S.T, B.TECH, M.TECH               | 9433985637 | soumencse@gmail.com        |
| Souvik Patra          | Technical Assistant | D.C.S.T, B.TECH, M.TECH               | 9433730433 | souvik.patra804@gmail.com  |
| Subhajit Biswas       | Technical Assistant | D.C.S.T, AMIE(PURSUING)               | 9830146357 | subhajitbesu@gmail.com     |
| Snehashis Saha        | Technical Assistant | M.Sc(Math),P.G.D .C.A, M.SC(Computer) | 9830573478 | snehasissaha@yahoo.com     |
| Amiya Ratan Rout      | Technical Assistant | M.Sc(Computer), M.TECH                | 9232606401 | shiboham@gmail.com         |
| Bishnu Pada choudhury | Technical Assistant | B.Sc, MCA                             | 9432926952 | bisbnu1@yahoo.com          |
| Suman Chakraborty     | Technical Assistant | B.TECH, M.TECH                        | 9831399726 | sumanrbrbehala@gmail.com   |
| Sanchayita Dhara      | Technical Assistant | D.E.T.C, AMIE(Pursuing)               | 9433957440 | sanchayita.dhara@gmail.com |
| OFFICE STAFF          |                     |                                       |            |                            |
| Malay Dhir            | Office Assistant    | B.com                                 | 9831365531 | malay_dhir@yahoo.co.in     |
| Suman Sarkar          | Group D             | Madhyamik                             | 9007612086 | sarkar_becit@yahoo.co.in   |
| Dinabandhu Sadhukhan  | Group D             | Madhyamik                             | 9062477213 |                            |

## Detailed Publications: Year: 2013- – 2014

### International Journals/Edited Volumes / Conference

#### International Journals

1. Nachiketa Das, Pranab Roy, and Hafizur Rahaman, "Bridging Fault Detection in Cluster Based FPGA by Using Muller C Element", *Journal of Computers & Electrical Engineering (Elsevier)*, 2013, (Accepted).
2. Nachiketa Das , Pranab Roy and Hafizur Rahaman, "Built-In-Self-Test Technique for Diagnosis of Delay Faults in Cluster Based Field Programmable Gate Arrays", *IET Computers & Digital Techniques*, 2013 (Accepted).
3. P. Ghosal, H. Rahaman, Koyel Mukherjee and Dibyendu Ballabh, "A low power, low jitter DLL based low frequency (250 kHz) clock generator", *Int. J. Signal and Imaging Systems Engineering*, Vol. 7, No. 1, pp.3-11, 2013.
4. Kamalika Datta, Indranil Sengupta, and Hafizur Rahaman, "A Particle Swarm Optimization based Reversible Circuit Synthesis", *Journal of Low Power Electronics*, Vol. 9 No. 3 , October 2013.
5. Indrajit Banerjee and Hafizur Rahaman, "Effective fault detection and routing scheme for wireless sensor networks", *Computer and Electrical Engineering (Elsevier)*, vol.39 (2013), (Accepted) (With PhD Student).
6. Dipak K. Kole, Hafizur Rahaman, Debesh K. Das, and Bhargab B. Bhattacharya, "Derivation of Test Set for Detecting Multiple Missing-Gate Faults in Reversible Circuits", *Computer and Electrical Engineering (Elsevier)*, vol.39 (2013), pp. 225-236, 2013 (With PhD Student).
7. Indrajit Pan, Ritwik Mukherjee, Hafizur Rahaman, Tuhina Samanta, Parthasarathi Dasgupta, "Optimization algorithms for the design of digital microfluidic biochips: A survey", *Computers & Electrical Engineering(Elsevier)*, 39(1): 112-121 (2013), 2013, (PhD. Student).
8. Biswanath Sethi, Sukanta Das: Convergence of Asynchronous Cellular Automata (Under Null Boundary Condition) and Their Application in Pattern Classification. Recent Advances in Natural Computing, 2014, pp. 35-55
9. Raju Hazari, Sukanta Das. On number conservation property of ECA under  $\alpha$ -asynchronous update. AUTOMATA 2014: 149-156
10. Raju Hazari, Sukanta Das. Number Conservation Property of Elementary Cellular Automata under Asynchronous update. Complex Systems, 23 pp. 177-195
11. Biswanath Sethi, Nazim Fatès, Sukanta Das: Reversibility of Elementary Cellular Automata under Fully Asynchronous Update. TAMC 2014: 39-49
12. Biswanath Sethi, Souvik Roy, Sukanta Das: Experimental study on convergence time of elementary cellular automata under asynchronous update. AUTOMATA 2013 Exploratory Papers: 87-96
13. Nazma Naskar, Sumit Adak, Sukanta Das: Identification of non-uniform periodic boundary cellular automata having only point states. AUTOMATA 2013 Exploratory Papers: 67-76
14. Biswanath Sethi, Sukanta Das. Modeling of asynchronous cellular automata with fixed-point attractors for pattern classification. CAAA 2013: 311-317
15. Subhamita Mukherjee, and Tuhina Samanta, "A Novel Fault Detection Mechanism in Digital Microfluidic Biochip"( #JETT-D-14-00009), under review 2nd round, Journal of Electronic Testing: Theory and Applications (Springer Verlag), May 2014.
16. Partha Pratim Saha, and Tuhina Samanta, "Obstacle Avoiding Delay Equalization for Rectilinear Clock Tree Routing based on a Game Theoretic Approach" International Journal of Engineering and Innovative Technology (IJEIT) Volume 3, Issue 4, October 2013, pages 341 – 349. ISSN: 2277-3754 ISO 9001:2008 Certified.
17. Indrajit Pan, and Tuhina Samanta, "A Droplet Clustering and Residue Removal Technique for Cross-contamination Avoidance in Digital Microfluidic Biochip", International Journal of Computer Information Systems and Industrial Management, ISSN 2150-7988, Volume 6 (5) pp.171 -183, 2013.
18. Indrajit Banerjee, Prasenjit Chanak, Tuhina Samanta, Hafizur Rahaman, "Effective Fault Detection and Routing (EFDR) Scheme for Wireless Sensor Network", Accepted in Elsevier Computers & Electrical Engineering, In press, July 2013.

19. Tuhina Samanta, Indrajit Pan, Ritwik Mukherjee, Hafizur Rahaman, and Parthasarathi Dasgupta, "Optimization Algorithms for Digital Microfluidic Biochips: A Survey", Volume 39, Issue 1, pages 112–121, January 2013.
20. Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee, "Fault-tolerant multipath routing scheme for energy efficient wireless sensor networks". International Journal of Information Processing, Volume 6 (2), 11 – 21.
21. Tuhina Samanta, Hafizur Rahaman, and Parthasarathi Dasgupta, "Near-optimal Y-routed Delay Trees in Nanometric Interconnect Design", Volume 5, Issue 1, 2011, pages 36–48.
22. Prasenjit Chanak, Hafizur Rahaman, Tuhina Samanta, Indrajit Banerjee "FTMRS: Fault Tolerance Routing Scheme for Wireless Sensor Network", International Journal of Wireless & Mobile Networks, Vol. 5, No. 2, April 2013.
23. Indrajit Banerjee, Anirban Datta, Sonalisa Pal, Soujanya Chatterjee, Tuhina Samanta, "A Novel Fault Detection and Replacement Scheme in WSN", Second International Symposium on Intelligent Informatics (ISI'13), 23-24, August 2013.
24. Supantha Das, Indrajit Banerjee, and Tuhina Samanta, "Sensor Localization and Obstacle Boundary Detection Algorithm in WSN", Third International Conference on Advances in Computing and Communications (ACC-2013), 29-31 August 2013.
25. Indrajit Banerjee, Prasenjit Chanak, Tuhina Samanta, Hafizur Rahaman "EFDR: Effective Fault Detection and Routing Scheme for Wireless Sensor Network", International Journal of Computers & Electrical Engineering, Elsevier (Accepted), 2013.
26. Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee, "Quad Tree Approach for Obstacle Discovery and Tracking in Wireless Sensor Networks", IEEE SENSOR 2013, Baltimore, USA, 3-6 November 2013.
27. Subhankar Chatterjee, Santi P. Maity and Tamaghna Acharya, "Energy Efficient Cognitive Radio System for Joint Spectrum Sensing and Data Transmission", Special Issue: Microwatts Wireless Technologies on IEEE Journal on Emerging and Selected Topics in Circuits and Systems VOL. 4, NO. 3, SEPTEMBER 2014, pp. 292-300.
28. Subhankar Chatterjee, Tamaghna Acharya, and Santi P. Maity, "On Optimized Decode and Forward Relay Assisted CR System Design for Throughput Maximization", Journal of Digital Signal Processing, Elsevier (Accepted).
29. Hirak Maity and Santi P. Maity, FPGA Implementation of Reversible Watermarking in Digital Images using Reversible Contrast Mapping, Journal of Systems and Software, Elsevier Science (Accepted).
30. Santi P. Maity, Seba Maity, Jaya Sil and Claude Delpha "Perceptually adaptive MC-SS image watermarking using GA-NN Hybridization in Fading Gain", Special issue on Journal Engineering Applications of Artificial Intelligence, vol.31, pp.3-14, May, 2014.
31. Santi P. Maity, Sumanta Hati and Chinmoy Maji, Optimal Power Allocation in DS-CDMA with Adaptive SIC Technique, Special issue, Springer Telecommunication System, Springer Verlag Volume 56, Issue 3 (2014), Page 335-346.
32. Santi P. Maity, Seba Maity, Jaya Sil, and Claude Delpha, Collusion resilient spread spectrum watermarking in M-band wavelets using GA-Fuzzy Hybridization, Journal of Systems and Software, Elsevier Science, vol. 86, no. 1, 47-59, 2013.
33. Santi P. Maity and Malay K. Kundu, Distortion free image-in-image communication with implementation in FPGA, International Journal of Electronics and Communication Engineering, Elsevier, vol. 67, no. 5, pp. 438-447, 2013.
34. Santi P. Maity, Seba Maity, Jaya Sil and Claude Delpha, Optimized Spread spectrum watermarking for fading-like collusion attack with improved detection, Special Issue on Wireless Personal Communications Journal, Springer Verlag, vol. 72, no.3, pp. 1737-1753 .
35. Anirban Bose and Santi P. Maity, Spread spectrum watermark design under noisy compressive sampling, Special Issue of International Journal of Computer Applications, pp. 36-41.
36. M. Dutt, A. Biswas, P. Bhowmick, and B. B. Bhattacharya, On the Family of Shortest Isothetic Paths in a Digital Object---An Algorithm with Applications, Computer Vision and Image Understanding (accepted).
37. M. Dutt, A. Biswas, P. Bhowmick, and B. B. Bhattacharya, On Finding a Shortest Isothetic Path and its Monotonicity inside a Digital Object, *Annals of Mathematics and Artificial Intelligence*, DOI: 10.1007/s10472-014-9421-y (in press).
38. A. Mukherjee, U. Garain, and A. Biswas, Experimenting with Automatic Text-to-Diagram Conversion: A Novel Teaching Aid for the Blind People, *Journal of Educational Technology & Society* (ISSN 1436-4522), 17(3), 40-53.

39. N. Karmakar, A. Biswas, P. Bhowmick, and B. B. Bhattacharya, A Combinatorial Algorithm to Construct 3D Isothetic Covers, *International Journal of Computer Mathematics*, Vol. 90(8), pp. 1571-1606, 2013, DOI: 10.1080/00207160.2012.734813.
40. M. Dutt, A. Biswas, and P. Bhowmick, Approximate Partitioning of 2D Objects into Orthogonally Convex Components, *Computer Vision and Image Understanding*, Vol. 117(4), pp. 326 - 341, 2013, DOI: 10.1016/j.cviu.2012.08.017.
41. A. Biswas, P. Bhowmick, M. Sarkar, and B. B. Bhattacharya, A Linear-time Combinatorial Algorithm to Find the Orthogonal Hull of an Object on the Digital Plane, *Information Sciences*, Elsevier, 2012, DOI: 10.1016/j.ins.2012.05.029.
42. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, On the Representation of a Digital Contour with an Unordered Point Set for Visual Perception, *Journal of Visual Communication and Image Representation*, Vol. 22(7), pp. 590 – 605, 2011, DOI: 10.1016/j.jvcir.2011.07.005.
43. S. Chatterjee, R. Karim, A. Biswas, A. K. Ray, Image Processing of Ultrasound Color Doppler to Characterize Malignant Breast Lesion, *Advanced Materials Research Journal (AMR)*, Vol. 403 – 408, pp. 830 – 834, 2011, DOI: 10.4028/www.scientific.net/AMR.403-408.830, ISSN:1022-6680.
44. S. Chatterjee, A. K. Ray, R. Karim, and A. Biswas, Architectural Design to Characterize Malignant Breast Lesion, *International Journal of Computer Applications*, Vol. 31(11), pp. 8-15, 2011, DOI: 10.5120/3939-5529, ISBN: 978-93-80865-13-7.
45. M. Dutt, A. Sarkar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Efficient Word Segmentation and Baseline Localization in Handwritten Documents Using Isothetic Covers, *International Journal of Digital Library Systems*, Vol. 2(3), pp. 1 – 13, 2011, DOI: 10.4018/jdls.2011070101.
46. M. Dutt, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, On Finding an Orthogonal Convex Skull of a Digital Object, *International Journal of Imaging Systems and Technology*, Vol. 21(1), pp. 14 – 27, 2011, DOI: 10.1002/ima.20266.
47. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, Construction of Isothetic Covers of a Digital Object: A Combinatorial Approach, *Journal of Visual Communication and Image Representation*, Vol. 21(4), pp. 295 – 310, 2010, DOI: 10.1016/j.jvcir.2010.02.001.
48. S. Pal, P. Bhowmick, A. Biswas, and B.B. Bhattacharya, Understanding Digital Documents Using Gestalt Properties of Isothetic Components, *International Journal of Digital Library Systems*, Vol. 1(3), pages 1 – 25, 2010, DOI: 10.4018/jdls.2010070101.
49. Tuhin Subhra Das, Prasun Ghosal, "A Provably Good Performance Centric NoC Topology", Accepted for publication in proceedings of Asia Pacific conference on Post Graduate Research in Microelectronics and Electronics - 2013 (PRIMEASIA), Visakhapatnam, India, 19-21 December 2013.
50. Md Zeeshan Ashraf, Dheeraj Kumar Choudhary, Rohan Lal Das, and Prasun Ghosal, "An Efficient and Optimized Recommendation System Using Social Network Knowledge Base", Accepted for publication in proceedings of International Conference on Advances in Electrical Engineering (ICAEE '14), Vellore, India, January 9-11, 2014.
51. Manodipan Sahoo, Prasun Ghosal, and Hafizur Rahaman, "An ABCD parameter based Modeling and Analysis of Crosstalk Induced Effects in Multiwalled Carbon Nanotube Bundle Interconnects", Accepted for publication in proceedings of 27th International Conference on VLSI Design (VLSID 2014), Mumbai, India, January 5-9, 2014.
52. Soumyajit Poddar, Prasun Ghosal, Priyajit Mukherjee, Suman Samui, and Hafizur Rahaman, "An Area and Power Efficient Dynamic TDMA based Photonic Network on Chip", Accepted for publication in proceedings of Fourth International Symposium on Electronic System Design (ISED 2013), NTU, Singapore, December 12-13, 2013.
53. Manodipan Sahoo, Prasun Ghosal, and Hafizur Rahaman, "An ABCD parameter based Modeling and Analysis of Crosstalk Induced Effects in Single-Walled Carbon Nanotube Bundle Interconnects", In proceedings of 5th Asia Symposium on Quality Electronic Design (ASQED 2013), Penang, Malaysia, August 26-28, 2013.
54. Mayukh Sarkar, Prasun Ghosal, and Saraju P. Mohanty, "Reversible Circuit Synthesis Using ACO and SA Based Quine-McCluskey Method", In proceedings of IEEE 56th International Midwest Symposium on Circuits and Systems (IEEE MWSCAS), Columbus, Ohio, USA, August 4-7, 2013, pp. 416-419. DOI: 10.1109/MWSCAS.2013.6674674
55. Debashri Roy, and Prasun Ghosal, "A Fuzzified Approach Towards Global Routing in VLSI Layout Design", In proceedings of 2013 IEEE International Conference on Fuzzy Systems (Fuzz-IEEE), Hyderabad, India, July 7-10, 2013.



56. Soujanya Chatterjee, Anirban Datta, Soumyajyoti Banerjee, Ashish Singhi, Vivek Kr. Mishra, Prasun Ghosal, "Mobile Embedded System for Advanced Weather Forecasting in Rural Area", In proceedings of Third International Conference on Advances in Information Technology and Mobile Communication 2013 (AIM 2013), Bangalore, India, April 26-27, 2013.
57. Prasun Ghosal, and Tuhin Subhra Das, "FL2STAR: A Novel Topology For On-Chip Routing in NoC with Fault Tolerance and Deadlock Prevention", In proceedings of 2013 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), Bangalore, India, Jan 17-19, 2013. Digital Object Identifier: [10.1109/CONECCT.2013.6469302](https://doi.org/10.1109/CONECCT.2013.6469302)
58. Prasun Ghosal, Arijit Chakraborty, and Sabyasachee Banerjee, "Honey Bee Based Vehicular Traffic Optimization and Management", In proceedings of Seventh International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2012), Advances in Intelligent Systems and Computing, Volume 202, 2013, pp 455-463.
59. Prasun Ghosal, Hafizur Rahaman, Koyel Mukherjee, and Dibyendu Ballabh, "A Low Power, Low Jitter DLL Based Low Frequency (250 KHz) Clock Generator", International Journal of Signal and Imaging Systems Engineering (Inderscience IJSISE), 2014, Vol.7, No.1, pp. 3 - 11, DOI: 10.1504/IJSISE.2014.057936.
60. T. Bhadra, M. Bhattacharyya, L. Feuerbach, T. Lengauer and S. Bandyopadhyay, DNA Methylation Patterns Facilitate the Identification of MicroRNA Transcription Start Sites: A Brain-specific Study, *PLoS ONE*, 8(6):e66722, 2013, DOI: 10.1371/journal.pone.0066722. (IF 2013: 3.534)
61. M. Bhattacharyya, M. Das and S. Bandyopadhyay, A New Approach for Combining Knowledge from Multiple Co-expression Networks of MicroRNAs, *IEEE Transactions on Biomedical Engineering*, 60(8):2167-2173, 2013, DOI: 10.1109/TBME.2013.2250285. (IF 2013: 2.233)
62. U. Maulik, A. Mukhopadhyay, M. Bhattacharyya, S. Bandyopadhyay, R. Eils, B. Brors and L. Kaderali, Mining Quasi-Bicliques from HIV-1–Human Protein Interaction Network: A Multiobjective Biclustering Approach, *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 10(2):423-435, 2013, DOI: 10.1109/TCBB.2012.139. (IF 2013: 1.536)
63. P. Chatterjee, M. Bhattacharyya, S. Bandyopadhyay and D. Roy, Studying the System-level Involvement of MicroRNAs in Parkinson's Disease, *PLoS ONE*, 9(4):e93751, 2014, DOI: 10.1371/journal.pone.0093751. (Latest IF: 3.534)
64. Srijit Chowdhury and Chandan Giri, "Data Gathering Optimization Technique Based Polling Point With Relay Hop Constraint", Submitted for Review, AD HOC NETWORKS journal, Elsevier, 2014. (under second revision).
65. Suman Bhowmik and Chandan Giri, A Fuzzy Communication Model of Sensor Nodes in Wireless Sensor Network, Submitted for review at International Journal of Sensor Network, Inderscience publishers, 2014. (under second revision).

#### **International Conference**

1. Manodipan Sahoo, Hafizur Rahaman and Bhargab Bhattacharya, "Impact of Inductance in the Performance of Singlewalled Carbon Nanotube Bundle Interconnects", ISED 2013(Accepted).
2. Pranab Roy, Mahua Raha Patra, Hafizur Rahaman and Parthasarathi Dasgupta, "An intelligent Biochip System for Diagnostic Process Flow based Integration of Combined Detection Analyzer", ISED 2013(Accepted).
3. Manodipan Sahoo, Prasun Ghosal and Hafizur Rahaman, "An ABCD parameter based Modeling and Analysis of Crosstalk Induced Effects in Single-Walled Carbon Nanotube Bundle Interconnects", *IEEE 5th Asian Symposium on Quality Electronic Design (ASQED 2013)* (accepted).
4. Soumyajit Poddar, Prasun Ghosal, Priyajit Mukherjee, Suman Samui and Hafizur Rahaman, "An Area and Power Efficient Dynamic TDMA based Photonic Network on Chip", ISED 2013(Accepted).
5. Chandan Bandyopadhyay, Debashri Roy, Kamalika Datta, Dipak K Koley and Hafizur Rahaman, "ESOP-based Synthesis of Reversible Circuit Using Improved Cube", ISED 2013, (Accepted).
6. Pranab Roy, Samadrita Bhattacharya, Hafizur Rahaman and Parthasarathi Dasgupta, "New Method for Droplet based Synthesis and Placement in Digital Microfluidic Biochips", *17<sup>th</sup> International Symposium on VLSI Design and Test 2013* (Accepted).
7. Sourav Chakraborty, Manodipan Sahoo and Hafizur Rahaman, "A 1.8 V 64.9  $\mu$ W 54.1 dB SNDR 1st order  $\Sigma\Delta$  modulator design using clocked comparator based switched capacitor technique", *IEEE 5th Asian Symposium on Quality Electronic Design (ASQED 2013)* (accepted).
8. Pranab Roy, Hafizur Rahaman, Parthasarathi Gupta, and Parthasarathi Dasgupta "A new customized testing technique using a novel design of droplet motion detector for digital microfluidic Biochip systems", [International Conference on Advances in Computing, Communications and Informatics \(ICACCI-2013\)](#).
9. Surajit Kumar Roy, Sobitri Chatterjee, Chandan Giri and Hafizur Rahaman, "Repairing of Faulty TSVs using Available Number of Multiplexers in 3D ICs", *IEEE 5th Asian Symposium on Quality Electronic Design (ASQED 2013)* (accepted).

10. Joyati Mondal, Debesh Das, Dipak Kumar Kole, Hafizur Rahaman and Bhargab B. Bhattacharya, "On Designing Testable Reversible Circuits Using Gate Duplication", *17<sup>th</sup> International Symposium on VLSI Design and Test 2013 (Accepted)*.
11. Kamalika Datta, B. Ghuku, D. Sandeep, I. Sengupta and Hafizur Rahaman, "A Cycle based Reversible Logic Synthesis Approach", *ICACC 2013 (Accepted)*.
12. Arighna Deb, Debesh K. Das, Hafizur Rahaman, Bhargab B. Bhattacharya, Robert Wille, Rolf Drechsler: Reversible Circuit Synthesis of Symmetric Functions Using a Simple Regular Structure. 5th Conference on Reversible Computation (RC 2013), pp.182-195.
13. Kamalika Datta, Gaurav Rathi, Robert Wille, Indranil Sengupta, Hafizur Rahaman and Rolf Drechsler, "Exploiting Negative Control Lines in the Optimization of Reversible Circuits", 5th Conference on Reversible Computation July 4th-5th, 2013, Victoria, Canada, pp.209-220.
14. Arighna Deb, Debesh K. Das, Hafizur Rahaman, Bhargab B. Bhattacharya: Reversible synthesis of symmetric boolean functions based on unate decomposition. ACM Great Lakes Symposium on VLSI 2013 (GLSVLSI 2013), pp. 351-352, Paris, France.
15. Manodipan Sahoo, and Hafizur Rahaman, "Performance Analysis of Multiwalled Carbon Nanotube Bundles", *2013 IEEE XXXIII International Scientific Conference Electronics and Nanotechnology (ELNANO 2013)*, pp. 200-204.
16. Pranab Roy, Rupam Bhattacharjee, Pampa Howladar, Hafizur Rahaman and Parthasarathi Dasgupta, "A new cross contamination aware routing technique with intelligent path exploration in Digital Microfluidic Biochips", *8<sup>th</sup> IEEE International conference on Design & Technology of Integrated Systems (DTIS'13)*.
17. Pranab Roy, Hafizur Rahaman and Parthasarathi Dasgupta, "Automated parallel detection based analyzer system for integrated bioassays in Digital Microfluidic Biochip", *2013 IEEE XXXIII International Scientific Conference Electronics and Nanotechnology (ELNANO 2013)*, pp.310 – 315.
18. Soumyajit Chatterjee, Hafizur Rahaman and Tuhina Samanta, "Multi-objective Optimization Algorithm for Efficient Pin-constrained Droplet Routing Technique in Digital Microfluidic Biochip", *14th International Symposium on Quality Electronic Design (ISQED 2013)*, pp. 252-256, Santa Clara, CA, 4Mar-6 Mar 2013.
19. Kamalika Datta, Vishal Shrivastav, Indranil Sengupta and Hafizur Rahaman, "Reversible Logic Implementation of AES Algorithm", *8<sup>th</sup> IEEE International conference on Design & Technology of Integrated Systems (DTIS'13)*
20. Pranab Roy, Mahua Raha Patra, Parthasarathi Dasgupta and Hafizur Rahaman, "Digital Microfluidic System: A New Design for Heterogeneous Sample Based Integration for Multiple DMFBs", *2013 IEEE International Symposium on Circuits and Systems (ISCAS 2013)*, Beijing, China, 19-23 May, 2013, pp.1905-1909.
21. Supantha Das, Indrajit Banerjee, Mainak Chatterjee and Tuhina Samanta, "Performance analysis of TDMA Based Data Transmission in WSN" accepted for publication in *IEEE 2014 14th International Conference on Intelligent Systems Design and Applications (ISDA 14)*, to be held at Japan, November 2014.
22. Nimisha Ghosh, Sanku Kumar Roy, Tuhina Samanta, and Indrajit Banerjee, "Path determination algorithm of Mobile Sinks for energy efficient data collection and optimal coverage in Wireless Sensor Network", accepted for publication in *ICIT Bhubaneswar*, to be held on December 2014
23. Indrajit Pan, and Tuhina Samanta, "Voltage Driven Electrowetting based Microfluidic Operations for Efficient Droplet Routing in Digital Microfluidic Biochips", accepted for publication in the proceedings of the *10th IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA'14)*, held at Senigallia, ITALY, September 2014.
24. Subhamita Mukherjee, Indrajit Banerjee, and Tuhina Samanta, "Defect aware droplet routing technique in digital microfluidic biochip", *IEEE International Advance Computing Conference (IACC)*, pages: 30 – 35, New Delhi, India, February, 2014,
25. Nimisha Ghosh; Indrajit Banerjee; Tuhina Samanta, "Energy Efficient Coverage of Static Sensor Nodes Deciding on Mobile Sink Movements using Game Theory", In proceedings of *IEEE Conference on Applications and Innovations in Mobile Computing (AIMoC 2014)*, pages: 118 – 125, Kolkata, India, March 2014.
26. Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee, "Quad-tree Approach for Obstacle Discovery and Tracking in Wireless Sensor Networks", *Proceedings of IEEE Sensor Conference*, Baltimore, USA, November 2013.

27. Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee, "Cluster Head Load Distribution Scheme for Wireless Sensor Networks", Proceedings of IEEE Sensor Conference, Baltimore, USA, November 2013.
28. Supantha Das, Indrajit Banerjee and Tuhina Samanta, "Sensor Localization and Obstacle Boundary Detection Algorithm in WSN, In proceedings of IEEE Third international conference on Advances in computing and communications, Kochi, India, pages: 412 - 415 August 2013.
29. Partha Pratim Saha, Sumanta Saha, and Tuhina Samanta, "An Efficient Intersection Avoiding Rectilinear Routing Technique in VLSI", In proceedings of International Conference on Advances in Computing, Communication and Informatics, Mysore, pages. 559-562, August 2013.
30. Indrajit Pan, and Tuhina Samanta, "Efficient Droplet Router for Digital Microfluidic Biochip using Particle Swarm Optimizer" In proceedings of SPIE Vol. 8760 87601Z, pages 1-10, India, January 2013.
31. Raka Sardar, Ratna Mondal, Tuhina Samanta, "Geometry Independent Wirelength Estimation Method in VLSI Routing" in proceedings of IEEE VLSI Design Conference, Pune, pages 257 – 261, January 2013.
32. A. Banerjee and S. P. Maity, "Energy Detection Based Cooperative Spectrum Sensing using Fuzzy Conditional Entropy Maximization," IEEE International Conference on Advanced Networks and Telecommunications Systems (IEEE ANTS 2014), 14-17 December, 2014, New Delhi, India (Accepted).
33. H. K. Maity, S. P. Maity and T. Bhattacharya, Prediction based Reversible Watermarking with Contrast Modification, IEEE international Image Processing Applications and Systems conference (IPAS'14), November, 5-7, 2014, Hammamet, Tunisia (Accepted).
34. A. Ray, S. P. Maity and H. K. Maity, On Maximization of Fuzzy Entropy for MR Image Segmentation at Compressed Sensing, IEEE international Image Processing Applications and Systems conference (IPAS'14), November, 5-7, 2014, Hammamet, Tunisia (Accepted).
35. T. Bhattacharya, S. P. Maity and H. K. Maity, Progressive Quality Access through Secret Sharing and Data Hiding Scheme, IEEE international Image Processing Applications and Systems conference (IPAS'14), November, 5-7, 2014, Hammamet, Tunisia (Accepted).
36. A. Bose, S. P. Maity and C. Delpha, On Improved Spread Spectrum Watermark Detection under Compressive Sampling", 5<sup>th</sup> European Conference European workshop on Visual Information Processing, December 10-12, 2013, Paris, France (Accepted).
37. A. Ray and S. P. Maity, CS Reconstructed MR image Segmentation using Morphological Enhancement and FCM, 4<sup>th</sup> International Conference of Emerging Applications of Information Technology (EAIT 2014), December 19-21, Kolkata, India (Accepted).
38. S. Chatterjee, A. Banerjee, S. P. Maity and T. Acharya, "Fuzzy C-Means Clustering in Energy Detection for Cooperative Spectral Sensing in Cognitive Radio System", 7<sup>th</sup> International Workshop on Multiple Access Communications, 27-28<sup>th</sup> August, Halmstad, Sweden (Accepted).
39. S. Sil Kar, S. P. Maity and Claude Delpha 'Retinal Blood Vessel Extraction Using Curvelet Transform and Conditional Fuzzy Entropy', Accepted in 22nd IEEE European Signal Processing Conference, EUSIPCO 2014, Lisbon, Portugal, September 1-5, 2014.
40. S. Sil Kar, S. P. Maity and Claude Delpha 'On Retinal Blood Vessel Extraction Using Curvelet Transform and Differential Evolution Based Maximum Fuzzy Entropy', Accepted in 21 IEEE International Conference on Image Processing, ICIP 2014, Paris, France, October 27-30, 2014.
41. S. Chatterjee, T. Acharya, and S.P. Maity, "On Joint Spectrum Sensing And Data Transmission In Relay Assisted Cognitive Radio Networks" Accepted in 9<sup>th</sup> IET International Conference on Communication Networks and Digital Signal Processing, 2014, Manchester Metropolitan University, UK, PP. 546-551.
42. S. Chatterjee, S.P. Maity and T. Acharya, "On Optimal Relay Power Allocation in Energy Efficient Cognitive Radio Networks" International Conference on Signal Processing and Communication , 2014, to be held in IISC Bangalore (Accepted).
43. P. Mukherjee, S. Chatterjee, S. P. Maity and T. Acharya, "On Optimal Power Allocation and Relay Assignment in Multiuser Cognitive Radio Networks', International Conference on Signal Processing and Communication , 2014, to be held in IISC Bangalore (Accepted).
44. S. Chatterjee, S. P. Maity and T. Acharya, "On Optimal Power Allocation for Joint Spectral Sensing and Data Transmission in CR Networks", 37th International Conference on Telecommunications and Signal Processing (TSP), 2014, Berlin, Germany, July 1-3, 2014 (Accepted).

45. S.P. Maity and S. Hati, "On CI/MC-CDMA System Design with Improved Receiver Performance" 37th International Conference on Telecommunications and Signal Processing (TSP), 2014, Berlin, Germany, July 1-3, 2014 (Accepted).
46. S. Sil kar and S. P. Maity, "Extraction of Retinal Blood Vessel using Curvelet and Fuzzy C-Means", 22<sup>ND</sup> International Conference on Pattern Recognition 2014, Stockholm, Sweden, 24-28<sup>th</sup> August, 2014 (Accepted).
47. Apurba Ray, Santi P. Maity and Sarat Yadav, 'On Segmentation of MR Images Using Curvelet and Fuzzy C-Means Under Compressed Sensing', Twentieth National Conference on Communication (NCC 2014, 28<sup>th</sup> Feb. to 1<sup>st</sup> March, 2014 (Accepted).
48. Tamaghna Acharya, Swagata Mandal and Santi P. Maity, Joint power and channel allocation for outage probability minimization in cognitive radio ad hoc networks, Fifth Int. Conf. on Communication Systems & Networks (COMSNETS-2013) (Presented)
49. Santi P. Maity, Seba Maity, Jaya Sil and Claude Delpha, Dynamic Allocation for Watermark Payload in MC-CDMA system under Fading Attack, Nineteenth National Conference On Communications, 15-17<sup>th</sup> February, 2013, IIT Delhi (Presented).
50. Shoubhik Chakraborty, Parveen Dhanuka, Anand Kumar and Santi P. Maity, Subcarrier and Power Allocation Scheme for Multiuser OFDM-based Cognitive Radio Systems, Nineteenth National Conference On Communications, 15-17<sup>th</sup> February, 2013, IIT Delhi (Presented).
51. Hirak Maity, Santi P. Maity and Claude Delpha, "A modified RCM for reversible watermarking with FPGA implementation" 4<sup>th</sup> European workshop on Visual Information Processing, June 10-12, 2013, Paris, France (Accepted).
52. Santi P. Maity and Hirak Maity, M-ary Reversible Contrast Mapping in Reversible Watermarking with Optimal Distortion Control, 2013 th Fourth National Conf. on Computer Vision, Pattern Recognition, Image Processing and Graphics, IIT Jodhpur, 18-21 December, 2013 (Accepted).
53. M. Bhattacharyya, S. Bhattacharya and S. Bandyopadhyay, Estimating Completeness in Streaming Graphs, In *Proceedings of the EDBT/ICDT International Workshop on Multimodal Social Data Management (MSDM)*, Athens, Greece, March 28, pp. 294-299, 2014 (ISSN: 1613-0073). [Acceptance rate: 37.5%]
54. M. Bhattacharyya, Analyzing Flightfox: Who takes the Cake before the Take-off?, In *Proceedings of the AAAI HCOMP Workshop on Crowdsourcing at Scale (CrowdScale)*, Palm Springs, USA, November 09, Position Paper 02, 2013.
55. M. Bhattacharyya, Opinion Ensembling: Learning from Dependent Judgements of the Crowd, In *Proceedings of the AAAI HCOMP Workshop on Crowdsourcing at Scale (CrowdScale)*, Palm Springs, USA, November 09, Shared Task Challenge Paper 01, 2013.
56. M. Bhattacharyya and S. Bandyopadhyay, Prioritization of Clusters for Post-genomic Analysis, In *Proceedings of the First International Conference on Computational Intelligence: Modeling, Techniques and Applications (CIMTA)*, Kalyani, India, September 27-28, Procedia Technology 10, pp. 3-12, Elsevier, 2013 (ISSN: 2212-0173). [Acceptance rate: 39%]
57. M. Bhattacharyya, Viability of Crowd-volunteered Open Research Reviews, In *Proceedings of the AAAI HCOMP Workshop on Volunteer-Based Crowdsourcing in Science, Public Health and Government (Citizen + X)*, Pittsburgh, USA, November 02, WS-14-20, pp. 6-7, AAAI Press, 2014 (ISBN: 978-1-577-35690-5).
58. Srijit Chowdhury and Chandan Giri, "Data Collection Point Based Mobile Data Gathering Scheme With Relay Hop Constraint", In Proc. of International Conference on Advances in Computing, Communications and Informatics (ICACCI-2013).
59. Suman Bhowmik, Deepshikha Mitra and Chandan Giri, "K-Fault Tolerant Topology Control in Wireless Sensor Network", In Proc. of International Symposium on Intelligent Informatics (ISI), 2013.
60. Surajit Kumar Roy, Sobitri Chatterjee, Chandan Giri and Hafizur Rahaman, "Repairing of Faulty TSVs using Available Number of Multiplexers in 3D ICs", In Proc. of IEEE 5th Asia Symposium on Quality Electronic Design (ASQED), 2013.
61. Manjari Pradhan, Debesh Das, Chandan Giri and Hafizur Rahaman, "Optimizing Test Time for Core-Based 3-D Integrated Circuits by a Technique of Bi-partitioning", In Proc. of IEEE EWDTS, 2013.
62. Suman Bhowmik and Chandan Giri, "Energy Efficient Fuzzy Clustering in Wireless Sensor Network", Accepted for publication in the Proc. of Ninth International Conference on Wireless Communication & Sensor Networks (WCSN), springer LNEE, IIIT Allahabad, 16-19<sup>th</sup> December, 2013.
63. Arya Ghosh, Dipak Kumar Koley, Chandan Giri and Aruna Chakraborty, "Detection and Measurement of Leaf Rust Disease in Wheat", Accepted for publication in International conference on Facets of Uncertainties and Applications (ICFUA), 2013. December, Kolkata.
64. Manjari Pradhan, Chandan Giri, Hafizur Rahaman, Debesh K. Das, "Optimal stacking of SOC's in a 3D-SIC for post-bond testing", In proc. Of IEEE 3DIC 2013: 1-5
65. Surajit Kumar Roy, Sobitri Chatterjee, Chandan Giri, Hafizur Rahaman, "Faulty TSVs identification and recovery in 3D stacked ICs during pre-bond testing", In proc. Of IEEE 3DIC 2013: 1-6.
66. Surajit Kumar Roy, Payel Ghosh, Hafizur Rahaman and Chandan Giri, "Session based Core Test Scheduling for Minimizing the Testing of 3D SOC", Accepted for publication in ICECS 2014

67. Amitava Halder, Chandan Giri and Amiya Halder, "Brain Tumor Detection using Segmentation based Object Labeling Algorithm", In Proc. of International Conference on Electronics, Communication and Instrumentation (ICECI), pages 1-4, Kolkata, India, January, 16-17 January, 2014
68. Sk. Latib, Madhumita Mukherjee, Dipak Kumar Kole, Chandan Giri, "Automatic Tortuosity Detection and Measurement of Retinal Blood Vessel Network", Accepted for presentation in ICACNI Conference, Kolkata, Published by Smart Innovation, Systems and Technologies. ISSN: 2190-3018, Springer Verlag, 24-26<sup>th</sup> June, 2014
69. Mamata Dutta, Suman Bhowmik and Chandan Giri, "Fuzzy Logic Based Implementation For Forest Fire Detection Using Wireless Sensor Network", Accepted for presentation in ICACNI Conference, Springer, Kolkata, Published by Smart Innovation, Systems and Technologies. ISSN: 2190-3018, Springer Verlag, 24-26<sup>th</sup> June, 2014.
70. Surajit Kumar Roy, Payel Ghosh, Chandan Giri and Hafizur Rahaman, Session based SoC test scheduling for 3D SOCs, in ISVLSI, 2014, 9-11<sup>th</sup> July, Tampa, Florida.
71. N. Dutta Roy, M. Someswar, H. Dalmia, and A. Biswas, Identification of Distinct Blood Vessels in Retinal Fundus Images, Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications: CompIMAGE'14, Pittsburgh, PA, USA, September 3-5, 2014, DOI: 10.1007/978-3-319-09994-1\_10.
72. N. Karmakar, A. Biswas, and P. Bhowmick, Segmentation of 3D Articulated Components by Slice-based Vertex-weighted Reeb Graph, 18<sup>th</sup> IAPR International Conference on Discrete Geometry for Computer Imagery: DGCI'14, Siena, Italy, Lecture Notes in Computer Science (LNCS) Vol. 8668, pp. 370-383, September 10-12, 2014, DOI: 10.1007/978-3-319-09955-2\_31.
73. S. Phani, S. Lahiri, and A. Biswas, Inter-rater Agreement Study on Readability Assessment in Bengali, International Conference On Natural Language Processing And Cognitive Computing, Imphal, India, March 10-12, 2014, DOI: 10.5121/ijnlc.2014.3303.
74. O. Bandyopadhyay, A. Biswas, and B. B. Bhattacharya, Long Bone Fracture Detection in Digital X-ray Images based on Concavity Index, 16<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'14, Brno, Czech Republic, Lecture Notes in Computer Science (LNCS) Vol. 8466, pp. 212-223, May 28-30, 2014, DOI: 10.1007/978-3-319-07148-0\_19.
75. B. Das, M. Dutt, A. Biswas, P. Bhowmick, and B. B. Bhattacharya, A Combinatorial Technique for Construction of Triangular Covers of Digital Objects, 16<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'14, Brno, Czech Republic, Lecture Notes in Computer Science (LNCS) Vol. 8466, pp. 76-90, May 28-30, 2014, DOI: 10.1007/978-3-319-07148-0\_8.
76. S. Bera, A. Biswas, and B. B. Bhattacharya, A Fast Digital-Geometric Approach for Granulometric Image Analysis, 2<sup>nd</sup> International Conference on Recent Advances in Information Technology: RAIT'14, Dhanbad, India, Advances in Intelligent Systems and Computing Vol. 266, pp. 37-47, March 13-15, 2014, DOI: 10.1007/978-81-322-1856-2\_5.
77. O. Bandyopadhyay, A. Biswas, B. Chanda, and B. B. Bhattacharya, Bone Contour Tracing in Digital X-ray Images based on Adaptive Thresholding, 5<sup>th</sup> International Conference on Pattern Recognition and Machine Intelligence, PReMI'13, ISI, Kolkata, India, Lecture Notes in Computer Science (LNCS) Vol. 8251, pp. 465-473, December 10-14, 2013, DOI: 10.1007/978-3-642-45062-4\_64.
78. A. Mukherjee, U. Garain, and A. Biswas, Evaluation of the Graphical Representation for Text-to-Graphic Conversion Systems, 10<sup>th</sup> IAPR International Workshop on Graphics Recognition, Lehigh University, Bethlehem, PA, USA, Aug. 20-21, 2013, DOI: 10.1007/978-3-662-44854-0\_20.
79. J. K. Das, S. K. Saha, and A. Biswas, Depth from Images Of External Outdoor Scenes, 8<sup>th</sup> Indian Conference on Computer Vision, Graphics and Image Processing: ICVGIP'12, Mumbai, India, ACM, New York, NY, USA, , Article 17 , pp. 1-7, Dec. 16 - 19, 2012, DOI: 10.1145/2425333.2425350
80. S. Phani, S. Lahiri, and A. Biswas, Culturomics On A Bengali Newspaper Corpus, International Conference on Asian Language Processing 2012 (IALP 2012), Hanoi, Vietnam, pp. 237-240, Nov. 13-15, 2012, DOI: 10.1109/IALP.2012.68.
81. N. Karmakar, A. Biswas, and P. Bhowmick, Fast Slicing of Orthogonal Covers Using DCEL, 15<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'12, Austin, Texas, USA, Lecture Notes in Computer Science (LNCS), Springer, Vol. 7655, pp. 16 – 30, Nov. 28–30, 2012, DOI: 10.1007/978-3-642-34732-0\_2.
82. M. Dutt, A. Biswas, P. Bhowmick, and B. B. Bhattacharya, On Finding Shortest Isothetic Path inside a Digital Object, 15<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'12, Austin, Texas, USA, Lecture Notes in Computer Science (LNCS), Springer, Vol. 7655, pp. 16 – 30, Nov. 28–30, 2012, DOI: 10.1007/978-3-642-34732-0\_1.
83. S. Chatterjee, A. K. Ray, R. Karim, A. Biswas, Classification of Malignant Tumors Using Multiple Sonographic Features, IEEE Proceedings of the International Conference on Recent Trends in Information Systems (ReTIS-2011), pp. 252 – 256, Dec. 21 – 23, 2011, Jadavpur University, Kolkata, India, DOI: 10.1109/ReTIS.2011.6146877.
84. S. Chatterjee, A. K. Ray, R. Karim, A. Biswas, Micro-calcification Detection to Characterize Malignant Breast Lesion, Annual IEEE India Conference (INDICON 2011), pp. 1 – 4, Dec. 16 – 18, 2011 Hyderabad, India, DOI: 10.1109/INDICON.2011.6139333.

85. S. C. Dutta, A. Biswas, S. Mitra, and C. Saha, Extraction of Lip Region from Video Sequences of Basic Facial Expressions, in Proc. of International Conference on Computational vision and Robotics: ICCVR'11, Aug. 13 – 14, 2011 (accepted).
86. N. Karmakar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Construction of 3D Orthogonal Cover of a Digital Object, in Proc. of 14<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'11, Madrid, Spain, Lecture Notes in Computer Science (LNCS), Springer, Vol. 6636, pp. 70 – 83, May 23 – 25, 2011, DOI:10.1007/978-3-642-21073-0\_9.
87. S. Chatterjee, R. Karim, A. Biswas, A. K. Ray, Image Processing of Ultrasound Color Doppler to Characterize Malignant Breast Lesion, in Proc. of International Conference on Control, Robotics and Cybernetics: ICCRC'11, New Delhi, India, IEEE Catalog Number: CFP1176M-PRT, ISBN: 978-1-4244-9709-6, pp. VI: 159 – 162, Mar 21 – 23, 2011, DOI: 10.4028/www.scientific.net/AMR.403-408.830.
88. M. Dutt, A. Biswas, and P. Bhowmick, ACCORD: With Approximate Covering of Convex Orthogonal Decomposition, in Proc. of 16<sup>th</sup> IAPR International Conference on Discrete Geometry for Computer Imagery: DGCI'11, Nancy, France, Lecture Notes in Computer Science (LNCS), Springer, Vol. 6607, pp. 489 – 500, April 6 – 8, 2011, DOI:10.1007/978-3-642-19867-0\_41.
89. S. Pal, P. Bhowmick, and A. Biswas, FACET: A Fast Approximate Circularity Estimation Technique, in Proc. of 2<sup>nd</sup> International Conference of Emerging Applications of Information Technology: EAIT'11, Kolkata, India, IEEE CS Press, pp. 106 – 109, February 19 – 20, 2011, DOI: 10.1109/EAIT.2011.45.
90. A. Sarkar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Combinatorial Construction of the Orthogonal Concavity Tree of a Digital Object, in Proc. of 2<sup>nd</sup> International Conference of Emerging Applications of Information Technology: EAIT'11, Kolkata, India, IEEE CS Press, pp. 210 – 213, 2011, DOI: 10.1109/EAIT.2011.55.
91. S. Pratihari, S. Pal, P. Bhowmick, A. Biswas, and B.B. Bhattacharya, Recognition of Hand-drawn Graphs Using Digital-geometric Techniques, in Proc. of 12<sup>th</sup> International Conference on Frontiers in Handwriting Recognition: ICFHR'10, Kolkata, India, IEEE Computer Society, pp. 89 – 94, November 16 – 18, 2010, DOI: 10.1109/ICFHR.2010.20.
92. A. Sarkar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Word Segmentation and Baseline Detection in Handwritten Documents Using Isothetic Covers, in Proc. of 12<sup>th</sup> International Conference on Frontiers in Handwriting Recognition: ICFHR'10, Kolkata, India, IEEE Computer Society, pp. 445 – 450, November 16 – 18, 2010, DOI: 10.1109/ICFHR.2010.76.
93. A. Biswas, M. Dutt, P. Bhowmick, and B. B. Bhattacharya, On Finding the Orthogonal Convex Skull of a Digital Object, in Proc. of 13<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'09, Playa del Carmen, Mexico, Research Publishing Services, Editors: Petra Wiederhold and Reneta P. Barneva, pp.25 – 36, November 24 – 27, 2009, DOI: 10.1002/ima.20266.
94. S. Pal, P. Bhowmick, A. Biswas, and B. B. Bhattacharya, GOAL: Towards understanding of Graphic Objects from Architectural to Line drawings, in Proc. of 8<sup>th</sup> International Workshop on Graphics Recognition: GREC'09, La Rochelle, France, Lecture Notes in Computer Science (LNCS), Springer, Vol. 6020, pp.81 – 92, July 22 – 23, 2009, DOI:10.1007/978-3-642-13728-0\_8.
95. A. Biswas, M. Sarkar, P. Bhowmick, and B. B. Bhattacharya, Finding the Orthogonal Hull of a Digital Object: A Combinatorial Approach, in Proc. of 12<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'08, Buffalo, USA, Lecture Notes in Computer Science (LNCS), Springer, Vol. 4958, pp. 124 – 135, April 7 – 9, 2008, DOI:10.1007/978-3-540-78275-9\_11.
96. A. Biswas, S. Khara, P. Bhowmick, and B. B. Bhattacharya, Extraction of Regions of Interest from Face Images Using Cellular Analysis, in Proc. of 1<sup>st</sup> Bangalore Annual Compute Conference: COMPUTE'08, Indian Institute of Science, Bangalore, India, ACM, Article No. 15, pp. 1 – 8, January 18 – 20, 2008, DOI: 10.1145/1341771.1341787.

#### **Edited Volumes:**

1. Indrajit Pan, and Tuhina Samanta, “Weighted Optimization of Various Parameters for Droplet Routing in Digital Microfluidic Biochips”, *Advances in Intelligent Systems and Computing (ISI 13)*, Volume 235, pages: 131 – 139, Springer Cham Heidelberg, London.
2. Indrajit Banerjee, Anirban Datta, Sonalisa Pal, Soujanya chatterjee, and Tuhina Samanta, “A Novel Fault Detection and Replacement Scheme in WSN, *Advances in Intelligent Systems and Computing (ISI 13)*, Volume 235, pages: 303 – 310, Springer Cham Heidelberg, London.
3. Santanu Datta, Indrajit Banerjee, and Tuhina Samanta, “Mobile Sink Management for Nonuniformly Distributed Sensor Node Coverage using a Game Theoretic Approach”, *Advances in Intelligent Systems and Computing (ISI 13)*, Volume 235, pages: 311 – 319.

#### **BOOK Published**

Data Abstraction and Problem Solving with JAVATM Walls and Mirrors , 3rd Edition 2011, Janet J Prichard [Bryant University] ,Frank Carrano [University of Rock Island], Indrajit Banerjee

### **Book Chapters**

#### **2013**

1. Tamaghna Acharya and Santi P. Maity, "Power Allocation in Cognitive Radio in Energy Constrained Wireless Ad Networks", IGI-CRN Book Chapter, Cognitive Radio Technology Applications for Wireless and Mobile Ad Hoc Networks Ed Natarajan Meghanathan & Yenumula B. Reddy, pp.248-270.
2. Anirban Bose and Santi P. Maity, Collusion Resilient Spread Spectrum Fingerprinting under Compressive Sampling for Forensic Application: An Intelligent Approach using GA-ANN Hybridization, Computational Intelligence for Digital Forensic (Accepted).

#### **2014**

1. Prasun Ghosal, Saraju Mohanty, "3D NoC: A Promising Alternative for Tomorrow's Nanosystem Design", in CMOS and Post-CMOS Perspectives of Electronic Device Scaling, Editors - Saraju P. Mohanty and Ashok Srivastava, IET (IEEE Counterpart of UK) [Accepted, Manuscript under preparation, 2015 (to be published)]
2. Prasun Ghosal, Mayukh Sarkar, Saraju Mohanty, "A New Paradigm towards Performance Centric Computation beyond CMOS: DNA Computing", in CMOS and Post-CMOS Perspectives of Electronic Device Scaling, Editors - Saraju P. Mohanty and Ashok Srivastava, IET (IEEE Counterpart of UK) [Accepted, Manuscript under preparation, 2015 (to be published)]

### ***Visitors to the Department***

#### **Delivered Invited talk:**

1. "Cognitive Radio: Scopes and Challenges for Future Wireless Communication", on 27<sup>th</sup> January, 2014 at Faculty development program (FDP) on "Fundamentals of fiber and wireless communications for the next generation systems" at Institute of Radio Physics and Electronics, University of Kolkata.
2. "Information Security and Media Protection" on 5<sup>th</sup> April, 2014 in Seminar on Web page design and information security at Ellite Institute of Engineering and Management, Sodepur, Kolkata.
3. "Convex Optimization and Some Applications on Signal Processing and Communications, on 12<sup>th</sup> June, 2014 workshop on Advanced Optimization Techniques in Engineering Application (OTA 2014) held on 10<sup>th</sup>-14<sup>th</sup> June 2014 at National Institute of Technology, Durgapur.
4. "Image Reconstruction from Sparse Representation" on 17<sup>th</sup> June, 2014 Short Term Course on Computer Vision and Pattern Recognition (CVPR-2014) held on 16<sup>th</sup>-20<sup>th</sup> June 2014 at National Institute of Technology, Durgapur (Pre-lunch session).
5. "Introduction to Pattern Recognition, Fuzzy C-means clustering and some applications" on 17<sup>th</sup> June, 2014 Short Term Course on Computer Vision and Pattern Recognition (CVPR-2014) held on 16<sup>th</sup>-20<sup>th</sup> June 2014 at National Institute of Technology, Durgapur (Post-lunch session).
6. "Energy Efficient Cognitive Radio Network" on 9<sup>th</sup> July, 2015 at Faculty Development Program on "Recent Advances in Computer Networking" organized by the Dept. of Comp. Sc. & Engg. of RCCIIT, Kolkata, held from 7<sup>th</sup> July to 11<sup>th</sup> July.
7. "Energy Efficient Cognitive Radio Network: Scope and Future Challenges" 3rd International Conference on 'Computing, Communication and Sensor Network *December, Puri, Odisha, 12-14th, 2014* .
8. Delivered couples of guest lectures as a part of the course on Advanced Topics in VLSI Systems (CSCE 6933) during Winter 2013 at Department of CSE, University of North Texas, USA.
9. 2. Invited talk on "3D NoC: A Promising Alternative For Tomorrow's Nanoscale System Design" at JIS College of Engineering, India during September 2014.

#### **Seminar, symposium/conference attended/organized in 2013-2014**

1. 22<sup>nd</sup> International Conference on Pattern Recognition 2014 , 24-28<sup>th</sup> August, 2014, Stockholm, Sweden (attended and presented research paper)

#### **Tutorial talk**

1. International Conference on Contemporary Computing and Informatics (IC3I 2014), Mysore on 27-29<sup>th</sup> November, 2014.

Title of Tutorial- Digital Watermarking: Optimization Framework, Random Gain Attack and Compressed Sensing

2. International Image Processing, Applications and System Conference (IPAS 2014) on 5-7<sup>th</sup> November, Hammamet, Tunisia (over Skype)

Title of Tutorial- Digital Image Watermarking: Optimization Framework, Random Gain Attack and Compressed Sensing .

## Technology Developed/ Innovations

### Others

### Placements: 2013-2014

| Sl.No | Dt of Visit    | Company Name  | IT(UG) | PG(ICE) | Total |
|-------|----------------|---------------|--------|---------|-------|
| 1     | 1 & 23-Aug-13  | EXL Service   | 7      |         | 7     |
| 2     | 2 & 8-Aug-13   | Deloitte      | 1      |         | 1     |
| 3     | 8 & 27-Aug-13  | Lexmark       | 3      |         | 3     |
| 4     | 21 & 22-Aug-13 | Mu-Sigma      | 5      |         | 5     |
| 5     | 8/29/2013      | PWC           | 3      |         | 3     |
| 6     | 10 & 11-Sep-13 | IBM           | 7      | 1       | 8     |
| 7     | 13 & 19-Sep-13 | Infosys       | 11     | 2       | 13    |
| 8     | 16 & 17-Sep-13 | CTS           | 10     | 1       | 11    |
| 9     | 9/24/2013      | Accenture     | 13     |         | 13    |
| 10    | 9/26/2013      | M Junction    | 1      |         | 1     |
| 11    | 10/3/2013      | Odessa        |        | 1       | 1     |
| 12    | 24&25-Oct-13   | Google        | 1      |         | 1     |
| 13    | 11/19/2013     | Balmer Lawrie | 1      |         | 1     |
| 14    | 19 /20-Nov-13  | Lister        | 1      |         | 1     |
| 15    | 11/21/2013     | Accelaries    | 1      |         | 1     |
| 16    | 1/16/2014      | Ericsson      | 4      |         | 4     |
| 17    | 20-1-14        | Reve System   | 1      |         | 1     |





*Department of Mathematics*



## About the Department

Since the inception of Bengal Engineering College, the Department of Mathematics earned a glorious heritage of conducting research activities in various fields of Applied Mathematics. The Department is involved in teaching Mathematics, including Probability, Statistics, Operations Research, Numerical Analysis and Computational Techniques using computers, to undergraduate and postgraduate students in various branches of Engineering and Architecture. The Department started a two year M.Sc. (Applied Mathematics) programme in the year 2000 with an intake of 25 (at present 27) students and it is successfully running in the Department. Apart from regular routine work like teaching, setting of question papers and evaluation of answer scripts in various examinations of this institution, the Department conducts M.Sc. and Ph.D. admission every year. The faculty members are also involved in many other academic and administrative activities of the Institution. The Department has a significant role in research. All the faculty members of this Department are involved in research activities in various fields of Pure and Applied Mathematics e.g. Fracture Mechanics, Thermoelasticity, Operations Research and Optimization, Reliability Theory, Statistics, Functional Analysis, Fuzzy Set Theory, Dynamical Systems, Mathematical Ecology, General Relativity, Cosmology, Mathematical Modeling in Epidemiology, Information Theory, Mathematical Biology, Special Functions, Quantum Mechanics, Fluid Dynamics, Financial Mathematics, Mathematical Elasticity, Nonlinear Data Analysis, Neural Network etc. As a mark of this, the number of research scholars awarded PhD from this Department and the number of research publications in various reputed journals have been increasing steadily over the years. At present **more than 60 research scholars are registered for Ph.D. programme** and currently **14** students have been enrolled for Ph.D. programme in the year 2014. In the last five years **34 research scholars** of this Department have been awarded **Ph.D. degree**.

**Academic Programmes:** The Department started its Academic Programme, from the very beginning, since the foundation of this Institution in the year 1956.

### Undergraduate Level :

At present, the Department is offering **12 courses** at the undergraduate level in different branches of Engineering and Architecture. **In every branch of Engineering Undergraduate programme has a Mathematics course in each of the first three semesters (approximately  $500 \times 3 = 1500$  students)**. Computer Science, Electronics and Telecommunications, Information Technology and Aerospace Engineering branches have Mathematics as a subject in the **4<sup>th</sup> semester (approximately 200 students)**. Department of Mathematics also offers **three elective** courses in B.E. **8<sup>th</sup> semester**. This Department also teaches **two courses in the B.Arch.** programme in the first two semesters.

Nil

- |     |   |                |
|-----|---|----------------|
| I.  | Degree offered  | Ph.D.(Sc)      |
| II. | No of candidates enrolled in<br>registered<br>awarded | 14<br>06<br>06 |

**Faculty position:**

Sanctioned faculty post...17.... Vacant Post 02.....

Faculty profile ( in the following table )

| Name                       | Designation       | Highest Qualification | Specialisation/<br>Research Area   | Contact No.<br>E-mail  |
|----------------------------|-------------------|-----------------------|--|--|
| Basudeb Mukhopadhyay       | Professor         | Ph.D                  | Elasticity, Thermo elasticity, Thermo visco elasticity, Micropolar elasticity  | bmukherjee2006@yahoo.co.in   |
| Binayak Sammadar Choudhury | Professor         | Ph.D                  | Functional Analysis, Topology, Nonlinear Dynamics, Mathematical Economics, Quantum Information theory, Fuzzy systems, Stochastic differential equation                                     | binayak@becs.ac.in,<br>binayak12@yahoo.co.in   |
| Asit Kumar Chongdar        | Professor (Retd.) | Ph.D                  | Lie theory and Special Functions.  | <a href="mailto:chongdarmath@yahoo.co.in">chongdarmath@yahoo.co.in</a>   |
| Guruprasad Samanta         | Professor         | Ph.D.                 | Mathematical Biology and Operations Research   | <a href="mailto:g_p_samanta@yahoo.co.uk">g_p_samanta@yahoo.co.uk</a><br><a href="mailto:gpsamanta@math.iests.ac.in">gpsamanta@math.iests.ac.in</a> |
| Murari Mitra               | Professor         | Ph.D.                 | Reliability Theory, Mathematical Statistics, Operations Research, Nonparametric Inference  | <a href="mailto:murarimitra@yahoo.com">murarimitra@yahoo.com</a>   |
| Jagabandhu De              | Professor & Head  | Ph.D.                 | Elasticity & Plasticity, Mathematical Methods, Fracture Mechanics, Fluid Mechanics   | <a href="mailto:jagabandhu_de@yahoo.com">jagabandhu_de@yahoo.com</a>   |
| Tapan Roy                  | Professor         | Ph.D.                 | Fuzzy and Intuitionistic Fuzzy set Theory, Inventory, Transportation, Reliability Optimization, Information Theory, Portfolio Optimization, Fuzzy and Stochastic Optimization              | roy_t_k@yahoo.co.in  |
| Sanat Majumder             | Professor         | Ph.D.                 | Information, Optimization, O.R, Entropy Optimization and its applications in different branches of Science and Technology  | majumder_sk@yahoo.co.in  |
| Asoke Kumar Dhar           | Professor         | Ph.D.                 | Non-linear waves in Ocean  | asoked@math.becs.ac.in   |
| Parbati Saha               | Professor         | Ph.D.                 | Computational Intelligence   | parbati_saha@yahoo.co.in   |
| Tapan Kar                  | Professor         | Ph.D.                 | Dynamical systems, stability and bifurcation theory, population dynamics, Mathematical Ecology (Theoretical studies on ecology, population management, food chain, conservation of aquatic | t_k_kar@yahoo.com  |

|                    |                     |       |  |                        |
|--------------------|---------------------|-------|--|------------------------|
|                    |                     |       | ecosystems, sustainable use of ecosystem services), Mathematical modeling in ecology and epidemiology, Pest control. |                        |
| Pritha Das         | Associate Professor | Ph.D. | Mathematical biology, Neural network, Nonlinear data analysis  | prithadas01@yahoo.com  |
| Shariful Alam      | Assistant Professor | Ph.D. | Financial Mathematics  | salam50in@yahoo.co.in  |
| Ujjal Debnath      | Assistant Professor | Ph.D. | Relativity, Cosmology and Astrophysics   | ujjaldebnath@yahoo.com |
| Smita Pal (Sarkar) | Assistant Professor | M.Sc. | Mathematical Theory of Elasticity & Plasticity   | smita1308gmail.com     |
|                    |                     |       |  |                        |

### Research area

Mathematical Biology , Operations Research, Fuzzy and Intuitionistic Fuzzy set Theory, Inventory, Transportation, Reliability Optimization, Information Theory, Portfolio Optimization, Fuzzy and Stochastic Optimization, Information, Optimization, Entropy Optimization, Mathematical Ecology, Dynamical systems, stability and bifurcation theory, population dynamics, mathematical modelling in ecology and epidemiology, management and conservation of fisheries, bio-economic modelling of renewable resources, Neural network, Nonlinear data analysis , Relativity, Cosmology, Astrophysics, Lie theory and Special Functions, Functional Analysis, Topology, Nonlinear Dynamics, Mathematical Economics, Quantum Information theory, Mathematical theory of Elasticity , Thermo elasticity, Thermo visco elasticity, Micropolar elasticity, Fracture Mechanics, Fluid Dynamics, Non-linear waves in Ocean, Computational Intelligence, Reliability Theory, Mathematical Statistics, Nonparametric Inference

### Support staff position:

Sanctioned technical post .....01

### Ongoing Sponsored Research / projects:

| Ongoing (Prof value)   | Sponsoring agency |
|--|-------------------|
| Incorporating ecosystem objectives into the management sustainable marine fisheries: Ecological economic modeling with some case studies along the costal side of West Bengal. –Rs.12,00,000/- | UGC               |
| Dark energy models and accelerating universe<br>Rs.16,00,000/-   | CSIR              |

**Details of publications of each faculty member (2013-14), (as per documents received from the faculty members)**

Journal .....More than 140.....; Annexure I  
Conference.....;  
Books/Monographs .....08 .....; Annexure II

**Seminar / Workshops/ Conferences/ Training programme organized by the department (2013-14) : (a) Ph.D course work, (b) Science Academies' Lecture Workshop on Advanced Topics in Mathematics, held during December 22-24, 2013**

**Foreign visits and Invited Lectures :**

1. Prof. Tapan Kumar Kar visited 'Center for Ecological Research, Kyoto University, Japan, during 2013-14 as visiting Professor.
2. Prof. Guruprasad Samanta visited National Autonomous University of Mexico (UNAM), Mexico during 1<sup>st</sup> April 2013 to 30<sup>th</sup> June 2013.
  - a. Prof. Tapan Kumar Kar Presented an invited talk entitled " Sustainability and economic consequences of creating marine protected areas in a multi-species multi-activity context" at Center for Ecological Research, Kyoto University, **Japan**, October, 2013.
  - b. Prof. Tapan Kumar Kar Presented an invited talk at Faculty of Environment and Information Sciences, **Yokohama National University, Japan**, January, 2014.
  - c. Prof. Tapan Kumar Kar Presented an invited talk at **Tsukuba University, Japan**, January, 2014.
  - d. Prof. Tapan Kumar Kar Presented an invited talk at **Kyushu University, Japan**, February, 2014.
  - e. Prof. Guruprasad Samanta presented an invited talk entitled "Analysis of a Delayed Hand-Foot-Mouth Disease (HFMD) Epidemic Model with Pulse Vaccination" in the national seminar on *Recent Perspectives on Nonlinear Mathematics & its Application* held at the Dept. of Mathematics, Visva-Bharati ( A Central University) during 25-26 Mar, 2014.
  - f. Prof. Guruprasad Samanta presented an invited talk entitled "Mathematical Modelling of Some Interacting Species" at the Dept. of Mathematics, CINVESTAV, IPN, Mexico on 12<sup>th</sup> June, 2013.
  - g. Prof. Guruprasad Samanta presented an invited talk entitled "Differential Equation Modelling of Some Interacting Species" in the conference of Jefe del Departamento de Matemáticas Aplicadas y Sistemas, División de Ciencias Naturales e Ingeniería, Universidad Autónoma Metropolitana Cuajimalpa, Artificios 40. Colonia Hidalgo, Del. Álvaro Obregón 01120, Mexico on 20<sup>th</sup> May, 2013.
  - h. Prof. Guruprasad Samanta presented an invited talk entitled " On Lotka-Volterra Model of Interacting Species" in the Institute of Mathematics, National Autonomous University of Mexico (UNAM), Mexico D.F., C.P. 04510 on 30<sup>th</sup> April, 2013.
  - i. Prof. Guruprasad Samanta presented an invited talk entitled "Dynamical Models of Some Interacting Species" in the Seminar on Biomathematics held at CIMAT, A. P. 402, Jalisco S/N, Valenciana, Guanajuato, GTO 36240, Mexico on 16<sup>th</sup> April, 2013.
  - j. Prof. Basudeb Mukhopadhyay delivered invited talk on the workshop "Science Academies' Lecture Workshop on Advanced Topics in Mathematics, held during December 22-24" held in BESU, Shibpur.
  - k. Prof. Murari Mitra delivered invited talk on the workshop "Science Academies' Lecture Workshop on Advanced Topics in Mathematics, held during December 22-24" held in BESU, Shibpur.



**Visitors of Your Department (Indian & Foreign) :**

Dr. Indranil Sengupta, Assistant Professor, Department of Mathematics, North Dakota State University, USA delivered an invited talk in entitled, : Option pricing and BN-S models in finance” in the Department of Mathematics, in the year 2013.

**New Academic/ Research Initiatives**

- a) **Academic Collaboration**
- b) **Industrial Collaboration**

**Others: Students awarded Ph.D.(Sc) in 2013-14 (received certificate in the convocation, 2014)**

**Kakali Karmakar (Sur), Ramesh Kar, Mohammed Zafar Anis, Amaresh Kundu, Nikhilesh Metiya, Debprasad Mazumder**

- K.Chakraborty, S.Halder, **T. K. Kar**- Global stability and bifurcation analysis of a delay induced prey-predator system with stage-structure, *Nonlinear Dynamics*, Vol. 73, (2013).
- Uttam Das, **T. K. Kar** , U. K. Pahari- Global dynamics of an exploited prey-predator model with constant prey refuge, *ISRN Biomathematics* , Article ID 637640, (2013).
- A .Ghorai and **T. K. Kar**- Biological control of a prey-predator system in the presence of a super predator, *Nonlinear Dynamics* , Vol. 74, (2013).
- K.Chakraborty, K. Das, **T. K. Kar**- An ecological perspective of marine reserves in prey–predator dynamics, *Journal of Biological Physics* , Vol. 39(4), (2013).
- Soovoojeet Janna **T. K. Kar**- A mathematical study of a prey-predator model in relevance to pest control, *Nonlinear Dynamics*, Vol. 74, (2013).
- **T. K. Kar**, Uttam Das- Regulation of an exploited prey predator system: A dynamic reaction model, *International Journal of Ecological Economics and Statistics*, Vol. 31(4), (2013).
- K.Chakraborty, K.Das ,**T.K.Kar**- Modeling and analysis of marine plankton system with nutrient recycling and diffusion, complexity, *Complexity*, Doi 10.1002/Cplx.21559, 2014.
- K.Chakraborty, Sanjoy Das, **T. K. Kar**- On non-selective harvesting of a multispecies fishery incorporating partial closure for the populations, *Applied Mathematics and Computation*, Vol. 221, (2013).
- Bapan Ghosh and **T. K.Kar**- Possible ecosystem impacts of applying maximum sustainable yield policy in food chain models, *Journal of Theoretical Biology* , Vol.329, (2013).
- **T. K. Kar**, Soovoojeet Jana- Application of three controls optimally in a vector-borne disease - a mathematical stud, *Communications in Nonlinear Science and Numerical Simulation*, Vol.18, (2013).
- K.Chakraborty S.Halder and **T. K.Kar**- Global stability and bifurcation analysis of a delay induced prey-predator system with stage-structure, *Nonlinear Dynamics*, Vol.73(3), (2013).
- K. Chakraborty, K.Das , **T. K. Kar**- Combined harvesting of a stage structured prey-predator model incorporate cannibalism in competitive environment, *C. R. Biologies* , Vol.336, (2013).
- U. K. Pahari , **T. K. Kar**- Conservation of a resource based fishery model through optimal taxation, *Nonlinear Dynamics*, Vol.72, (2013).
- **T. K.Kar** , Bapan Ghosh - Impacts of maximum sustainable yield policy to prey-predator systems, *Ecological Modelling*, Vol.250, (2013).
- Bapan Ghosh , **T. K.Kar**- Maximum sustainable yield and species extinction in ecosystem: Some new results, *Journal of Biological Physics* , Vol.39(3), (2013).
- Soovoojeet Jana and **T. K .Kar**- Modelling and analysis of a prey-predator system with disease in the prey, *Chaos, Solitons and Fractals*, Vol.47, (2013).
- **T. K.Kar** , Bapan Ghosh- Sustainability and economic consequences of creating marine protected area in multi-species multi-activity context, *Journal of Theoretical Biology*, Vol.318, (2013).
- **T. K. Kar**, Soovoojeet Jana Abhijit Ghorai- Effect of isolation in an infectious disease, *International Journal of Ecological Economics and Statistics*, Vol.29(2), (2013).
- **T. K. Kar** Soovoojeet Jana- Stability and bifurcation analysis of a stage structured predator-prey model with time delay, *Applied Mathematics and Computation*, Vol.219(8), (2013).
- **T. K. Kar**, A.Ghorai, Soovoojeet Jana- Dynamic consequences of prey refuges in a two predator one prey system, *Journal of Biological Systems*, Vol.21(2), (2013).
- **T. K. Kar** Soovoojeet Jana- A theoretical study on mathematical modeling of an infectious disease with application of optimal control, *BioSystems*, Vol.111, (2013).

- **T. K. Kar** and Prasanta Mondal- Dynamical behaviour of a tuberculosis model with outcome of reinfection and optimal steering, International Journal of Ecological Economics and Statistics, Vol.28(1), (2013).
- Kunal Das, Milon Chakraborty, K. Chakraborty, **T. K. Kar**- Modelling and analysis of a multiple delayed exploited ecosystem towards coexistence perspective, Vol.78, (2014).
- Uttam Das, **T. K. Kar**, Soovoojeet Jana- Dynamical behaviour of a delayed stage-structured predator-prey model with nonmonotonic functional response, International Journal of Dynamics and Control, 10.1007/s40435-014-0110-9 (2014).
- Bapan Ghosh, **T. K. Kar**, Tarzen Legovic- Relationship between exploitation, oscillation, MSY and extinction, Mathematical Biosciences, Vol.256, (2014).
- Bapan Ghosh, **T. K. Kar**, Prosenjit Paul- Extinction scenarios in exploited system: Combined and selective harvesting approaches, Ecological Complexity, Vol.19, (2014).
- Bapan Ghosh, **T. K. Kar**, Tarzen Legovic- Sustainability of exploited ecologically interdependent species, Population Ecology, Vol.56, (2014).
- Kunal Das, M.Chakraborty, K.Chakraborty, **T. K. Kar**- Modelling and analysis of delayed exploited ecosystem towards coexistence perspective, Nonlinear Dynamics, (2014).
- K.Chakraborty, M.Chakraborty, **T. K. Kar**- Sustainable development of European Hake resource: Bioeconomic perspective, Journal of Biological Systems, (2014).
- Bapan Ghosh, **T. K. Kar**- Sustainable use of prey species in a prey-predator system: Jointly determined ecological thresholds and economic trade-offs, Ecological Modelling, Vol.272, (2014).
- Uttam Das, **T. K. Kar**- Bifurcation analysis of a delayed predator-prey model with Holling type III functional response and predator harvesting, Dynamics, 543041, (2014).
- P. K. Mondal, Soovoojeet Jana, **T. K. Kar**- A theoretical approach on controlling agricultural pest by biological controls, Acta Biotheoretica, Vol.62, (2014).
- S.Shaw & **B.Mukhopadhyay**- Theory of generalized micropolar thermoelastic diffusion – Int. J. Appl. Math. Mech., Vol-9(11), 2013.
- S.Shaw & **B.Mukhopadhyay**- Moving heat source response in micropolar half space with two temperature- Continuum Mechanics and Thermodynamics, Vol-25 (4), 2013.
- M.Mondal & **B.Mukhopadhyay**- A cylindrical problem with rheological volume, density property on thermo-visco-elastic medium in magnetic field – Int. J. Appl. Math. Mech., 9(2), 2013.
- Aritra Bhattacharyya & **B.Mukhopadhyay**- Study of linear isotropic micropolar plate in asymptotic approach- Computers Math. Applic, Vol.-66(6), 2013.
- S.Shaw & **B.Mukhopadhyay**- Moving heat source response in thermoelastic microelongated solid- Journal of Engineering Physics and Thermophysics Vol.86(3), 2013.
- M.Mondal & **B.Mukhopadhyay**- A two temperature thermo-viscoelastic problem with rheological properties, Int. J. Appl. Math. Mech., Vol.-9(17), 2013
- M.Mondal & **B.Mukhopadhyay**- Effect of two temperature on thermo-visco elastic problem with rheological properties- Int. J. Phys. Math. Sciences, Vol-3(2), 2013.
- Aritra Bhattacharyya & **B.Mukhopadhyay**- Classical plate theory : Asymptotic approach- Int. J. Phys. Math. Sciences, Vol-3(2), 2013.
- Anusree Bhattacharyya & **B.Mukhopadhyay**- Propagation of two collinear Griffith cracks in an isotropic elastic medium using complex variable techniques- IJMCS, ISST Journal of Mathematics and Computing System, Vol.-4(1), 2013
- M.Mondal & **B.Mukhopadhyay** – Effect of rheological property of density on generalized magneto-thermo-visco-elastic problem- Bull.Cal.Math.Soc, Vol-105(3), 2013.
- M.Mondal & **B.Mukhopadhyay**- Two- temperature and rheological effects in a viscoelastic isotropic material with temperature dependent properties - Journal of Engineering Physics and Thermophysics, Vol-87(5), 2014.
- M.Mondal & **B.Mukhopadhyay** -Two temperature electro-magneto-thermo-visco- elastic response with rheological properties and temperature dependent moduli- Int. J. Phys. Math. Sciences, Vol-4(2), 2014.
- M.Mondal & **B.Mukhopadhyay**- A thermo-visco-elastic problem with rheological volume and density properties- Int. J. Appl. Math. Mech., Accepted for publication.
- M.Mondal & **B.Mukhopadhyay**- Two temperature and rheological response on the thermo-viscoelastic medium subjected to magnetic field- Int. J. Appl. Math. Mech., Accepted for publication.

- A.Garai & T.K.Roy, Intuitionistic fuzzy optimization: Usage of hesitation index, IJCT, Vol 10(4), 2013.
- S.P.Mondal and T.K.Roy, First Order Linear Non Homogeneous Ordinary Differential Equation in Fuzzy Environment Based On Laplace Transform, J. Math. Comput. Sci. 3 (2013), No. 6,
- S.P.Mondal and T.Kumar Roy, Application of First order Non Homogeneous Fuzzy Differential Equation, Advances in Fuzzy Sets and Systems, Volume 16, Number 1, 2013, Pushpa Publishing House.
- Payel Ghosh, T.K.Roy, Intuitionistic fuzzy goal geometric programming problem (IFG2P2) based on geometric mean method, International journal of engineering research and technology, Vo. 2, Issue 11, 2013.
- A. Garai, T. K. Roy, Travelling sales person problem solution under intuitionistic fuzzy environment, TJFS, 2013.
- A. Garai, T. K. Roy, Weighted Intuitionistic Fuzzy Delphi Method, Journal of Global Research in Computer Science, Vol-4, Issue-7, 2013
- A. Garai, T. K. Roy, Optimization under generalized intuitionistic fuzzy environment, International Journal of Computer Application, 73(13), 2013.
- Surapati Pramanik, T.K. Roy , Game theoretic model to the Jammu-Kashmir conflict between India and Pakistan, International Journal of Mathematical Archive-4(8), 2013.
- Payel Ghosh, T. K. Roy - Fuzzy goal geometric programming problem using logarithmic deviational variables, Turkish journal of fuzzy systems, 2013, vol. 4, No. 1.
- Payel Ghosh, T.K.Roy - Goal geometric programming problem ( $G^2P^2$ ) with crisp and imprecise targets, Journal of global research in computer Science, 2013, Vol. 4, No. 8.
- D. K. Jana, K. Maity, T.K. Roy -A three-layer supply chain integrated production inventory model under permissible delay in payments in uncertain environments, Journal of uncertainty analysis and applications, 2013,1:6.
- Sankar Prasad Mondal and Tapan Kumar Roy , First Order Linear Homogeneous Fuzzy Ordinary Differential Equation Based on Lagrange Multiplier Method, Journal of Soft Computing and Applications, 2013, jsca-00032.
- Sankar Prasad Mondal and Tapan Kumar Roy, First Order Linear Homogeneous Ordinary Differential Equation in Fuzzy Environment Based On Laplace Transform, 2013,ifsva-00174, Journal of Fuzzy Set Valued Analysis.
- A. L. Guha, T. K. Roy and M. Debnath (2013), Optimization of the Weight of the Skin Plate of a Vertical Lift Gate Based on Fuzzy Geometric Programming Technique, Dam Engineering, vol-XXIII, Issue-3, 2013.
- Payel Ghosh, T. K. Roy- A Goal Geometric Programming Problem( $G2P2$ ) with logarithmic deviational variables and its applications on two industrial problems, Journal of Industrial engineering International 2013,9:5.
- S. P. Mondal, T. K. Roy- First order linear non homogenous ordinary differential equation in fuzzy environment, Mathematical theory and modeling, 3(1) (2013).
- S. P. Mondal, S. Banerjee, T. K. Roy- First order linear homogenous ordinary differential equation in fuzzy environment, International journal of pure and applied sciences and technology, 14(1) (2013), pp.16-26.
- D. K. Jana, B. Das, T.K. Roy - A Partial backlogging inventory model for deteriorating item under fuzzy Inflation and discounting over random planning horizon: A fuzzy genetic algorithm approach, Advances in operation research, 2013, article ID 973125,.
- D. K. Jana, K. Maity, T.K. Roy - A two-warehouse EOQ model for deteriorating items and stock dependent demand under conditionally permissible delay in payment in imprecise environment, AMO- Advanced Modeling and Optimization, vol.5, No. 2, 2013.

- D. K. Jana, K. Maity, T.K. Roy - A Bi-fuzzy approach to a production-recycling-disposal inventory problem with environment pollution cost via genetic q22, 2013.
- D. K. Jana, K. Maity, T.K. Roy - Multi item production inventory model with fuzzy rough coefficients via geometric programming approach, Opsearch, 2013.
- D. Chakraborty, D. K. Jana, T. K. Roy- A new approach to solve fully fuzzy transportation problem using triangular fuzzy number, *Int. Journal of Operational Research(IJOR)*, 2014.
- D. K. Jana, K. Maity, T. K. Roy- A multi-objective multi-item inventory control problem in fuzzy-rough environment using soft computing techniques, *Advances in Decision Sciences (ADS)*, 2014.
- D. K. Jana, M. Maiti, T. K. Roy- A fuzzy differential approach to a two plants production-recycling-disposal inventory problem via genetic algorithms, *Int. J. Fuzzy Computation and Modelling(IJFCM)*, 2014.
- A.K.Shaw and TK.Roy, Fuzzy Reliability Optimization based on FuzzyGeometric Programming Method using different operators, *Journal of Fuzzy Mathematics (USA)* (Accepted, 2014).
- A.K.Shaw,D.K.Jana and T.K.Roy, Multi-stage Mixed System Reliability viaRandom fuzzy,Possibility and Credibility Measure, *Journal of Fuzzy Mathematics (USA)* (Accepted, 2014).
- Sanhita Banerjee, T. K. Roy, Linear and Quadratic Equations with Applications in Fuzzy Environment, *The Journal of Fuzzy Mathematics*, (Accepted)
- Payel Ghosh, T.K.Roy, Intuitionistic fuzzy goal geometric programming problem, Notes on Intuitionistic fuzzy sets, (Accepted).
- S.P.Mondal and T.K.Roy, First Order Linear Homogeneous Fuzzy Ordinary Differential Equation with initial value as triangular intuitionistic fuzzy number, *Journal of Uncertainty in Mathematics Science* (Accepted).
- A.K.Shaw and T.K.Roy, Reliability Analysis of the System with Imprecise Constant Failure Rate of the Components, *IAPQR Transaction* (Accepted, 2014).
- Shaw,A.K. and Roy.T.K- Trapezoidal Intuitionistic Fuzzy Number with some arithmetic operations and its application on reliability evaluation, *Int.J.Mathematics in Operational Research*, Vol.5, No. 1, 2013.
- Swarnali Sharma and G.P.Samanta, Dynamical Behaviour of a Two Prey and One Predator System, *Differ Equ Dyn Syst*, DOI 10.1007/s12591-012-0158-y, 13 January 2013.
- Swarnali Sharma and G.P.Samanta, Drinking as an epidemic : a mathematical model with dynamic behavior, *Journal of Applied Mathematics and Informatics*, Vol.31, No.1-2, p.1-25, 2013.
- Swarnali Sharma and G.P.Samanta, Analysis of an epidemic model with non-linear incidence and vaccination, *International Journal of Ecological Economics & Statistics*, Vol.28, No.1, p.104-129, 2013.
- D.Pal, G.S.Mahapatra and G.P.Samanta, Optimal harvesting of prey–predator system with interval biological parameters: A bioeconomic model, *Mathematical Biosciences*, Vol.241, p.181-187, 2013.
- D.Pal, G.S.Mahapatra and G.P.Samanta, Quota Harvesting Model for a Single Species Population Under Fuzziness, *IJMS*, Vol. 12, No. 1-2, pp. 33-46, January-June 2013.
- Swarnali Sharma and G.P.Samanta, Analysis of a fractional-order competition model with common inhibitory effect, *International Journal of Ecological Economics & Statistics*, Vol.31, No.4, p.68-86, 2013.
- Swarnali Sharma and G.P.Samanta, DYNAMICAL BEHAVIOUR OF A DRINKING EPIDEMIC MODEL, *Journal of Applied Mathematics and Informatics*, Vol.31, No.5-6, p.747-767, 2013.
- Swarnali Sharma and G.P.Samanta, Dynamical Behaviour of an HIV/AIDS Epidemic Model, *Differ Equ Dyn Syst*, DOI 10.1007/s12591-013-0173-7, 28 June 2013.
- Swarnali Sharma and G.P.Samanta, Mathematical analysis of a single-species population model in a polluted environment with discrete time delays, *Journal of Mathematics*, Volume 2013, Article ID 574213, 18 pages, <http://dx.doi.org/10.1155/2013/574213>.

- Swarnali Sharma and G.P.Samanta, Dynamical Behaviour of a Tumor-Immune System with Chemotherapy and Optimal Control, *Journal of Nonlinear Dynamics*, Vol. 2013, Article ID 608598, 13 pages, <http://dx.doi.org/10.1155/2013/608598>.
- G.S. Mahapatra, T.K. Mandal and G.P. Samanta, EPQ model with fuzzy coefficient of objective and constraint via parametric geometric programming, *V Int. J. Operational Research*, Vol.17, No.4, p.436-448, 2013.
- A.K.Pal and G.P.Samanta, A Ratio-dependent Eco-epidemiological Model Incorporating a Prey Refuge, *Universal Journal of Applied Mathematics* , Vol.1, No.2, p. 86-100, 2013, DOI: 10.13189/ujam.2013.010208.
- Shilpi Pal, G.S. Mahapatra and G.P.Samanta, An inventory model of price and stock dependent demand rate with deterioration under inflation and delay in payment, *Int J Syst Assur Eng Manag*, DOI 10.1007/s13198-013-0209-y, 2013.
- Swarnali Sharma and G.P.Samanta, Optimal harvesting of a two species competition model with imprecise biological parameters, *Nonlinear Dyn*, DOI 10.1007/s11071-014-1354-9, 29 March 2014.
- G.P.Samanta and Swarnali Sharma, Analysis of a delayed Chlamydia epidemic model with pulse vaccination, *Applied Mathematics and Computation* Vol. 230, p.555–569, 2014.
- G.P.Samanta, Analysis of a delayed hand–foot–mouth disease epidemic model with pulse vaccination, *Systems Science & Control Engineering: An Open Access Journal*, Vol. 2, p.61–73, 2014, <http://dx.doi.org/10.1080/21642583.2014.880827>.
- D.Pal, G.S.Mahapatra and G.P.Samanta, Bifurcation analysis of predator–prey model with time delay and harvesting efforts using interval parameter, *Int. J. Dynam. Control*, DOI 10.1007/s40435-014-0083-8, 26 March 2014.
- Debasis Manna and G.P. Samanta, Bioeconomic modeling of a single species fishery with Von Bertalanffy law of growth, *Electronic Journal of Applied Statistical Analysis*, Vol. 7, Issue 1, 2014, p.117-131, DOI: 10.1285/i20705948v7n1p117.
- Debaldev Jana and G.P.Samanta, Role of multiple delays in ratio-dependent prey-predator system with prey harvesting under stochastic environment, *Neural, Parallel, and Scientific Computations*, Vol.22 , p.205-222, 2014.
- Swarnali Sharma and G.P.Samanta, Analysis of a two prey one predator system with disease in the first prey population, *International Journal of Dynamics and Control*, DOI: 10.1007/s40435-014-0107-4, 2014.
- Shilpi Pal, G.S.Mahapatra and G.P.Samanta, An EPQ model of ramp type demand with Weibull deterioration under inflation and finite horizon in crisp and fuzzy environment , *International Journal of Production Economics*, DOI: 10.1016/j.ijpe.2014.05.007, 2014.
- G.P.Samanta, Analysis of a delayed epidemic model with pulse vaccination, *Chaos, Solitons & Fractals* 66 (2014) p.74–85.
- Swarnali Sharma and G.P.Samanta, A ratio-dependent predator-prey model with Allee effect and disease in prey, *J. Appl. Math. Comput.*, DOI: 10.1007/s12190-014-0779-0, 2014.
- G. P.Samanta, Analysis Mathematical analysis of a Chlamydia epidemic model with pulse vaccination strategy, *Acta Biotheoretica*, DOI: 10.1007/s10441-014-9234-8, 2014.
- G.P.Samanta, A delayed hand-foot-mouth disease model with pulse vaccination strategy, *Computational and Applied Mathematics*, DOI: 10.1007/s40314-014-0170-7, 2014.
- Swarnali Sharma and G.P.Samanta, 'Analysis of a Chlamydia Epidemic Model', *J. Biol. Syst.* (2014) DOI: 10.1142/S0218339014500296.
- G.P.Samanta and Ricardo Gómez Áfiza, Analysis of a delayed epidemic model of diseases through droplet infection and direct contact with pulse vaccination, *International Journal of Dynamics and Control*, 2014, DOI 10.1007/s40435-014-0134-1.
- D. Pal, G. S. Mahapatra, G. P. Samanta, Stability and bionomic analysis of fuzzy parameter based prey–predator harvesting model using UFM, *Nonlinear Dynamics*, 2014, DOI 10.1007/s11071-014-1784-4.
- Swarnali Sharma and G.P.Samanta, A Leslie–Gower predator–prey model with disease in prey incorporating a prey refuge, *Chaos, Solitons & Fractals*, 2014, DOI 10.1016/j.chaos.2014.11.010.

- Piyali Bagchi Khatua, Shuvendu Chakraborty and Ujjal Debnath- Role of Entropy-Corrected New Agegraphic Dark Energy in Horava-Lifshitz Gravity, International Journal of Theoretical Physics, Vol. 52, No. 2, (2013).
- Chayan Ranjit, Shuvendu Chakraborty and Ujjal Debnath- Variable Modified Chaplygin Gas in Anisotropic Medium with Kaluza-Klein Metric, International Journal of Theoretical Physics, Vol. 52, No. 3, (2013).
- Ujjal Debnath and Surajit Chattopadhyay- Statefinder and Om Diagnostics for Interacting New Holographic Dark Energy Model and Generalized Second Law of Thermodynamics, International Journal of Theoretical Physics, Vol. 52, No. 4, (2013).
- Sayani Maity and Ujjal Debnath- Correspondence between Fermionic Field and other Dark Energies, Astrophysics and Space Science, Vol. 345, No. 2, (2013).
- Ujjal Debnath, Surajit Chattopadhyay and Mubasher Jamil- Fractional Action Cosmology: Some Dark Energy Models in Emergent, Logamediate and Intermediate Scenarios of the Universe, Journal of Theoretical and Applied Physics, Vol. 7, No. 1, (2013).
- Sayani Maity and Ujjal Debnath- Roles of Different Forms of Scale Factor in Non-linear Electrodynamics for Accelerating Universe, International Journal of Theoretical Physics, Vol. 52, No. 7, (2013).
- Chayan Ranjit, Shuvendu Chakraborty and Ujjal Debnath- Observational Study of Higher Dimensional Magnetic Universe in Non-linear Electrodynamics, Astrophysics and Space Science, Vol. 346, No. 1, (2013).
- Jhumpa Bhadra, Shuvendu Chakraborty and Ujjal Debnath- Dynamical System Analysis for Anisotropic Universe in Brans-Dicke Theory, International Journal of Theoretical Physics, Vol. 52, No. 9, (2013).
- Chayan Ranjit, Shuvendu Chakraborty and Ujjal Debnath- Observational Constraints of Homogeneous Higher Dimensional Cosmology with Modified Chaplygin Gas, European Physical Journal Plus, Vol. 128, (2013).
- Ritabrata Biswas and Ujjal Debnath- Constraining Red-shift Parametrization Parameters of Dark Energy: Loop Quantum Gravity as Background, European Physical Journal C, Vol.- 24, (2013).
- Jhumpa Bhadra and Ujjal Debnath- Primordial Black Holes Evolution in  $f(T)$  Gravity, International Journal of Theoretical Physics, Vol. 53, No. 2, (2014) .
- Ujjal Debnath and Sayani Maity- Correspondence of F-essence with Chaplygin Gas Cosmology, European Physical Journal Plus, Vol. 129 (2014).
- Tanwi Bandyopadhyay and Ujjal Debnath- Thermodynamic Study of Non-Linear Electrodynamics in Loop Quantum Cosmology, Astrophysics and Space Science, Vol. 350, No. 2, (2014).
- Jhumpa Bhadra and Ujjal Debnath- Constraining the Parameters of New Variable Modified Chaplygin Gas Model, International Journal of Theoretical Physics, Vol. 53, No. 6, (2014).
- Ujjal Debnath- Thermodynamics in Higher Dimensional Vaidya Space-Time, International Journal of Theoretical Physics, Vol. 53, No. 6, (2014).
- Prabir Rudra and Ujjal Debnath- Gravitational Collapse with Dark Energy and Dark Matter with Horava-Lifshitz Gravity, International Journal of Theoretical Physics, Vol.53, No.8 (2014).
- Rahul Ghosh and Ujjal Debnath- Reconstruction of  $f(G)$  gravity with ordinary and entropy corrected (m,n) type Holographic dark energy model, European Physical Journal Plus, Vol.129 (2014).
- Ritabrata Biswas and Ujjal Debnath- Red-shift Parametrization Parameters in Brans-Dicke Theory: Evolution of Open Confidence Contours, Astrophysics and Space Science, Vol.353, No.2 (2014).
- Ujjal Debnath- Accretions of Various Types of Dark Energies onto Morris-Thorne Wormhole, European Physical Journal C, Vol. 74, (2014).
- Prabir Rudra and Ujjal Debnath- Gravitational Collapse in Vaidya Space-Time for Galileon Gravity Theory, Canadian Journal of Physics, (Accepted) (2014).

- Ujjal Debnath, Mubasher Jamil, Ratbay Myrzakulov and M. Akbar- Thermodynamics of Evolving Lorentzian Wormhole at Apparent and Event Horizons, International Journal of Theoretical Physics, (Accepted) (2014).
- Ujjal Debnath- New Holographic Dark Energy in Chern-Simons Gravity and Cosmography, International Journal of Theoretical Physics, (Accepted) (2014).
- Chayan Ranjit, Prabir Rudra and Ujjal Debnath- Study of Some Parameters of Modified Chaplygin Gas in Galileon Gravity Theory from Observational Perspective, Canadian Journal of Physics, (Accepted) (2014) .
- Ritabrata Biswas and Ujjal Debnath- Observational Constraints of Redshift Parametrization Parameters of Dark Energy in Horava-Lifshitz Gravity, International Journal of Theoretical Physics, (Accepted) (2014).
- Prabir Rudra, Ritabrata Biswas and Ujjal Debnath- Gravitational Collapse in Husain space-time for Brans-Dicke Gravity Theory with Power-law Potential, Astrophysics and Space Science, (Accepted) (2014) .
- Chayan Ranjit and Ujjal Debnath- Constraining Parameters of Generalized Cosmic Chaplygin Gas in Loop Quantum Cosmology, Astrophysics and Space Science, (Accepted) (2014) .
- Ujjal Debnath- Reconstructing  $f(R)$ ,  $f(G)$ ,  $f(T)$  and Einstein-Aether Gravities from Entropy-Corrected (m,n) type Pilgrim Dark Energy, Astrophysics and Space Science, (Accepted) (2014) .
- Ujjal Debnath- Reconstructions of Einstein-Aether Gravity from Ordinary and Entropy-Corrected versions of Holographic and New Agegraphic Dark Energy Models, Advances in High Energy Physics, Vol. 2014(2014) 475862(1-10).
- Tanwi Bandyopadhyay, Ujjal Debnath, Mubasher Jamil, Faiz-ur-Rahman and Ratbay Myrzakulov- Thermodynamics of an Evolving Lorentzian Wormhole with Entropy Corrections, International Journal of Theoretical Physics, (Accepted) (2014) .
- Abdul Jawad and Ujjal Debnath- Correspondence of  $f(R, \nabla R)$  Modified Gravity with Scalar Field Models, Advances in High Energy Physics, (Accepted) (2014).
- Ujjal Debnath and B. C. Paul- Evolution of Primordial Black Hole in Modified Chaplygin Gas in the Background of  $f(T)$  Gravity, Astrophysics and Space Science, (Accepted) (2014).
- J. Mondal and A.K.Dhar, "The third order nonlinear evolution equation for two Stokes wave trains for gravity capillary waves in the presence of air flowing over water." Bull. Cal.Math. Soc.105(2), (2013).



## **Annexure II**

- 1.** Cosmological Models in Einstein's Gravity and Gravitational Collapse, Academic Publishing GmbH & Co. KG, Germany, 2011 by Dr. Ujjal Debnath
- 2.** A Text Book of Discrete Mathematics, New Age International, 2013 by Dr. Guruprasad Samanta
- 3.** A Text Book of Engineering Mathematics Vol-I , New Age International, 2014 by Dr. Guruprasad Samanta
- 4.** A Text Book of Engineering Mathematics Vol-II , New Age International, 2013 by Dr. Guruprasad Samanta
- 5.** A Text Book of Engineering Mathematics Vol-III , New Age International, 2014 by Dr. Guruprasad Samanta
- 6.** A Text Book of Engineering Mathematics Vol-IV , New Age International, 2013 by Dr. Guruprasad Samanta
- 7.** A first Course on Operation Research and Information theory, New Central Book Agency, 2013 by Dr. Sanat Kumar Majumder
- 8.** Probability, Statistics and Random Process, New Central Book Agency, 2014 by Dr. Sanat Kumar Majumder

*Department of Mechanical  
Engineering*



## About the Department

The inception of the Mechanical Engineering Department may be traced back to 1921 when a diploma course in Mechanical Engineering was started in this Institute. The first degree course in Mechanical Engineering was started from 18th July, 1930. Over the last eight decades, the Department of Mechanical Engineering consolidated to its present condition offering 8-Semester Undergraduate Courses with an approximate current intake of 66 students annually and 4-Semester Postgraduate Courses with an intake of 27 students annually. The post-graduate course in the department started in the year 1954. Currently PG course is offered in three specializations, namely, Machine Design, Heat Power Engineering and Production Engineering, leading to the degree of Master of Engineering. Six PhD scholars enrolled in the department during 2012-13.

### Academic Programmes:

|      |   |   |
|------|---|---|
| a.   | <b>Undergraduate Level</b>  |   |
| i.   | Degree offered  | Bachelor of Engineering (Mechanical)                              |
| ii.  | Sanctioned students' intake   | 60  |
| iii. | Additional intake through lateral entry in 3 <sup>rd</sup> Semester | 06  |
| b.   | <b>Postgraduate Level</b>   |   |
| i.   | Degree offered  | Master of Engineering (Mechanical)                                |
| ii.  | Sanctioned students' intake   | 27  |
| iii. | Additional intake through other programmes (i.e. QIP)               | NIL   |
| iv.  | Specialisations in  | Machine Design, Heat Power Engineering and Production Engineering |
| c.   | <b>Doctoral Level</b>   |   |
| i.   | Degree offered  | Ph.D.   |
| ii.  | No of candidates enrolled   | 06  |
|      | registered  | 05  |
|      | awarded   | NIL   |

### Faculty position:

Sanctioned faculty post...**26**.... Vacant Post ...**09**.....

| Name          | Designation        | Highest Qualification | Areas of Interest   | Contact Information<br>E-mail/Tel. No.                          |
|---------------|--------------------|-----------------------|---|---|
| Dr. S.K. Saha | Professor and Head | Ph. D.                | Heat Power Engineering.   | sujoy_k_saha@hotmail.com  |
| Dr. D. Datta  | Professor          | Ph.D.                 | Ultrasonic Non-destructive evaluation, Composite Materials, Machine | debasis_datta@rediffmail.com<br>91-33-2668 4561-63<br>Extn: 297 |

|                       |                     |          |  |  |
|-----------------------|---------------------|----------|--|--|
|                       |                     |          | Design   |  |
| Dr. S.K. Guha         | Professor           | Ph. D.   | Machine Design & Bearing Lubrication                                   | gsk@mech.becs.ac.in  |
| Dr. S.K. Karmakar     | Professor           | Ph.D.    | Tribology (Friction, Wear Modelling, Contact Mechanics, Machine Design | skk@mech.becs.ac.in  |
| Dr. A.K. Dutta        | Professor           | Ph.D.    | M/C. Design  | apurba@mech.becs.ac.in   |
| Dr. B.K. Bhattacharya | Professor           | Ph.D.    | Production Engg.   | bidyut@mech.becs.ac.in   |
| Dr. B.K. Mandal       | Professor           | PhD      | Numerical Heat Transfer, CFD, Combustion                               | bijan@mech.becs.ac.in<br>Mobile:9830017592                               |
| Dr. S. Chatterjee     | Professor           | Ph.D.    | Nonlinear Dynamics of mechanical and Micro-mechanical systems          | shychat@gmail.com<br>2668-4561; extn: 357<br>Mobile: 9831689337          |
| Dr. S. Chakraborty    | Professor           | Ph.D.    | Power Plant Engineering, CFD, Biomedical                               | <a href="mailto:somnathbec@rediffmail.com">somnathbec@rediffmail.com</a> |
| Sri A.K. Chowdhury    | Associate Professor | M.E.     | M/C. Design, Combustion  | achinkumar_becs@rediffmail.com   |
| Dr. P.P. Dey          | Associate Professor | Ph.D     | CAD/CAM, Fracture Mechanics  | ppdey2000@yahoo.com  |
| Dr. S. Ghosh          | Associate Professor | Ph.D     | Power Plant Engineering, Renewable Energy                              | sudipghosh.becollege@gmail.com<br>91-33-2668-4561,<br>Extn:279           |
| Sri A Guha            | Assistant Professor | M. Tech. | Advanced Machining, Fluid flow   | aguha_me@rediffmail.com  |
| Dr. S C Mondal        | Assistant Professor | Ph.D     | Production Engg.   | sc_mondal1@igmail.com  |
| Dr. A. Ganguly        | Assistant Professor | Ph.D     | Heat Power Engineering, Greenhouse Technology                          | aritra78@gmail.com<br>9433032840, EXT-795                                |
| Sri U. Rana           | Assistant Professor | M. Tech. | Thermal Engineering, CFD   | rana.uttam@gmail.com<br>+91 973444 2497                                  |
| Sri R.N. De           | Assistant Professor | M.E      | Production   | rathin5500@yahoo.com<br>9231532180 (M)                                   |

**Research area** (only mention broad titles without description in detail):

Numerical Heat Transfer  
Multi-phase Flow and CFD  
Combustion and alternative fuels  
Bio-fluid Dynamics  
Multiphase flow  
Renewable Energy  
Greenhouse Technology  
Tribology  
Dynamics, Vibration and Control  
Composite Materials  
NDT  
Non-Conventional Machining

**Research facilities:** (name specific equipment)

|    |   |
|----|---|
| 1  | Surface Profilometer (created under DST-FIST)           |
| 2  | Pin-on-disc Machine (created under DST-FIST)            |
| 3  | High-temp high-vacuum tribometer (yet to be installed)  |
| 4. | Ansys software (created under AICTE project)            |
| 5  | Athena Visual Studio software (created under UGC grant) |
| 6  | g-PROMS (created under UGC grant)                       |
| 7  | Aspen simulation software (created under UGC grant)     |
| 8  | Variable compression ratio internal combustion engine   |
| 9  | Different heat transfer equipment test rigs             |
| 10 | Vapour absorption AC test rig                           |
| 11 | MPFI engine model                                       |
| 12 | Several models of power plant equipments                |

**Name of the laboratories:** No new laboratory was established during the period.

**Support staff position:**

(i) Sanctioned technical post...08

(ii) Technical staff profile (in the following table )

| Name              | Designation     | Highest Qualification | Contact No. | E-mail   |
|-------------------|-----------------|-----------------------|-------------|--|
| Ashish Kumar Paul | Tech Asst Gr I  | DME                   | 94333-43232 |  |
| Bijit Kumar De    | Tech Asst Gr II | M.E                   | 94334-13093 | <a href="mailto:bijitde@yahoo.com">bijitde@yahoo.com</a> |
| Subhasish Pradhan | Tech Asst Gr II | DME, BSc              | 94344-67729 |  |
| Nani Gopal Roy    | Tech Asst Gr II | M.E                   | 94331-03465 |  |
| Kankar Mohan Das  | Tech Asst Gr II | DME                   | 98304-36517 |  |
| Pradip Kumar Dey  | Mechanic        | ITI                   | 99037-70323 |  |

**Sponsored Research:**

| <b>Ongoing/Completed in the Period</b>  | <b>Sponsoring Agency</b>        |
|---|---------------------------------|
| Tribology and Vibration control<br>FIST, 16,800,000 INR   | DST, GOI<br>Ongoing             |
| Modeling of Mass Transport through<br>Arterial Wall during Initiation and<br>Progression of Atherosclerosis,<br>539,000 INR   | AICTE (RPS scheme)<br>Completed |
| Heat Transfer and Pressure Drop<br>Characteristics of Turbulent Flow through a<br>Circular Tube Fitted with Helical Ribs and<br>Twisted Tapes with Oblique Teeth, 19,55000<br>INR   | DST, GOI<br>(2011-till date)    |
| Heat Transfer and Pressure Drop<br>Characteristics of Turbulent Flow of Air,<br>Water and Servotherm Medium Oil through<br>Circular, Rectangular and Square Ducts<br>Fitted with Helical Ribs and Twisted Tapes<br>with Oblique Teeth, 15,66000 INR | UGC<br>(2012-till date)         |
| Heat Transfer and Pressure Drop<br>Characteristics of Laminar & Turbulent Flow<br>through a Circular Duct Fitted with<br>Transverse Ribs and Wire Coil Inserts,<br>12,75000 INR   | AICTE<br>(2013-till date)       |

**No. of publications: 2013-14**

Journals: 52

Conference: 35

|    |   |   |      |       |            |
|----|---|---|------|-------|------------|
| 1  | Mathematical Model Development for Optimum Orientation of a Flat Plate Collector  | International Journal of Emerging Technology and Advanced Engineering | 2013 | 3(3)  | 613-621    |
| 2  | Numerical Prediction of Fuel Dilution Effect on the Flame Structure and Temperature Distribution in Diffusion Flame                                       | International Journal of Emerging Technology and Advanced Engineering | 2013 | 3(3)  | 139-145    |
| 3  | Study on the Effect of Cooling Water Temperature Rise on Loss Factor and Efficiency of a Condenser for a 210 MW Thermal Power Plant                       | International Journal of Emerging Technology and Advanced Engineering | 2013 | 3(3)  | 485-489    |
| 4  | Impact of Magnetic Field Strength on Magnetic Fluid Flow through Channel  | International Journal of Engineering Research & Technology            | 2013 | 2(7)  | 1-8        |
| 5  | Numerical Study of Radiation and Air preheating Effect on the Velocity, Temperature and Species Distribution in a Confined Laminar Coflow Diffusion Flame | Computational Thermal Sciences  | 2013 | 5(5)  | 425-440    |
| 6  | Mass Deposition and Fluid Flow in Stenotic Arteries: Rectangular and Half-circular Models   | Journal of Biomedical Science and Engineering                         | 2013 | 6(12) | 1109-1116. |
| 7  | Experimental Study on the Performance of Biodiesel Fuelled CI Engine Using Exhaust Gas Recirculation  | International Journal of Emerging Technology and Advanced Engineering | 2013 | 3     | 89-95      |
| 8  | Performance Characteristics of Spark Ignition Engine Using Ethanol as Fuel at Different Operating Conditions  | International Journal of Emerging Technology and Advanced Engineering | 2013 | 3     | 96-100     |
| 9  | The Effect of Exhaust Gas Recirculation (EGR) In Compression Ignition Engine  | International Journal of Emerging Technology and Advanced Engineering | 2013 | 3     | 106-111    |
| 10 | Production, Storage and Properties of Hydrogen as Internal Combustion Engine  | International Journal of Emerging Technology and                      | 2013 | 3     | 119-125    |



|    |   |   |      |         |  |
|----|---|---|------|---------|--|
|    | Fuel: A Critical Review   | Advanced Engineering  |      |         |  |
| 11 | Numerical Study of Gravity Effect on the Nitric Oxide Formation in Co-Flow Methane -Air Diffusion Flame   | International Journal of Emerging Technology and Advanced Engineering                               | 2013 | 3       | 146-152                                      |
| 12 | Environmental Impacts of Halogenated Refrigerants and Their Alternatives: Recent Developments   | International Journal of Emerging Technology and Advanced Engineering                               | 2013 | 3       | 400-409                                      |
| 13 | Enhancement of heat transfer of laminar flow through a circular tube having integral helical rib roughness and fitted with wavy strip inserts                 | Exp. Thermal Fluid Science  | 2013 | 50      | 107-113                                      |
| 14 | ENHANCED HEAT TRANSFER, in Mechanical Engineering, [Eds. UNESCO-EOLSS Joint Committee], in Encyclopedia of Life Support Systems(EOLSS)                        | Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK,<br>[http://www.eolss.net] | 2013 |         | Retrieve<br>d                                |
| 15 | Editorial, special issue on 8th ECI conference on Boiling and Condensation  | Heat Transfer Engineering   | 2013 | 35(5)   | 415-419                                      |
| 16 | Editorial on special issue on High Heat Flux Electronics Cooling  | ASME J Heat Transfer  | 2013 | 135(11) | 110501<br>doi:<br>10.1115/<br>1.40246<br>26. |
| 17 | Enhancement of heat transfer of laminar flow of viscous oil through a circular tube having integral helical rib roughness and fitted with helical screw-tapes | Exp. Thermal Fluid Science  | 2013 | 47      | 81-89  |
| 18 | Laminar flow heat transfer enhancement in a circular tube having integral transverse rib roughness and fitted with centre-cleared twisted-tape                | Exp. Thermal Fluid Science  | 2013 | 44      | 727-735                                      |
| 19 | Laminar flow heat transfer and pressure drop in a circular tube having wire-coil and helical screw-tape inserts   | ASME J Heat Transfer  | 2013 | 135(2)  | 021901,<br>8 pages                           |
| 20 | Thermohydraulics of laminar flow through a circular tube having integral helical  | Chemical Engg. Communications   | 2013 | 200(3)  | 418-436                                      |

|    |   |  |      |        |  |
|----|---|--|------|--------|--|
|    | corrugations and fitted with helical screw-tape inserts   |  |      |        |  |
| 21 | Modeling and performance analysis of a solar collector supported desalination system coupled with multi-effect humidification | International Journal of Scientific and Engineering Research   | 2013 | 4(12)  | 6-9  |
| 22 | A new iso-parametric machining algorithm for free form surface  | IMechE, Part-E   |      |        | DOI:<br>10.1177/<br>0954408<br>9134951<br>91 |
| 23 | Development of non Masing characteristic model for LCF and ratcheting fatigue simulation of SA333 C-Mn steel                  | Mechanics of Materials, Elsevier                               | 2013 | 65     | 88-102                                       |
| 24 | Morphological and Kinematic Aspects of Human Spine – As Design Inputs for Developing Spinal Implants                          | Journal of Spine   | 2013 | 2(4)   | 1-4  |
| 25 | Modelling Robustness in Serial Multistage Manufacturing Processes   | International Journal of Production Research, Taylor & Francis | 2013 | 51(21) | 6359-6377                                    |
| 26 | Modelling Robustness for Manufacturing Processes: A Critical Review   | International Journal of Production Research, Taylor & Francis | 2013 | 52(2)  | 521-538                                      |
| 27 | Modelling Robustness in Serial Multistage Manufacturing Processes   | International Journal of Production Research, Taylor & Francis | 2013 |        | DOI:10.1080/00207543,798052                  |
| 28 | Velocity Characteristics Study of Cutting Fluid Flowing through a Sudden Contraction Configuration                            | Engineering Sciences International Research Journal            | 2014 | 2(1)   | 129-131                                      |
| 29 | A 2-D Numerical Simulation on Flow - Induced Wall Shear Stress for an Abdominal Aortic Aneurysm Model                         | Engineering Sciences International Research Journal            | 2014 | 2(1)   | 132-134                                      |
| 30 | A Review: Enhancement of Heat Transfer with Nanofluids  | International Journal of Engineering Research & Technology     | 2014 | 3(4)   | 549-557                                      |
| 31 | Study on the Effect of Steady, Simple Pulsatile and Physiological Pulsatile Flows through a Stenosed Artery                   | Heat and Mass Transfer   | 2014 | 50(10) | 1343-1352                                    |
| 32 | Flow through a Sudden Expansion: A Review   | International Journal of Engineering &                         | 2014 | 4(4)   | 167-180                                      |

|    |  |   |      |       |           |
|----|--|---|------|-------|-----------|
|    |  | Science Research  |      |       |           |
| 33 | A Numerical Study on Pressure and Velocity Characteristics of Fluid Passing through a Plain Suddenly Expanded and Contracted Channel                     | International Journal of Emerging Technology and Advanced Engineering | 2014 | 4(7)  | 218-226   |
| 34 | First Law and Second law Analysis of mechanical Vapour Compression Refrigeration System using Refrigerants CFC12, R134a and R290                         | International Journal of Current Engineering and Technology           | 2014 | 3     | 191-196   |
| 35 | Numerical Investigation of the Performance and Emission Characteristics of a CI engine using Diesel and its blends with Ethanol and Jatropa Biodiesel    | International Journal of Current Engineering and Technology           | 2014 | 3     | 5-9       |
| 36 | Numerical Simulation of CI Engine Characteristics Fueled with Soyabean Biodiesel and its Blends  | Engineering Sciences International Research Journal                   | 2014 | 2     | 159-162   |
| 37 | Computer Based Thermodynamic Properties of Alternative Refrigerant R-134A  | Engineering Sciences International Research Journal                   | 2014 | 2     | 163-169   |
| 38 | Effect of Injection Pressure on the Performance and Emissions of Biodiesel Fueled CI Engine  | Engineering Sciences International Research Journal                   | 2014 | 2     | 217-220   |
| 39 | An Experimental Study on the Performance and Emission Characteristics of a CI Engine Fuelled with Jatropa Biodiesel and its Blends with Diesel           | Journal of Mechanical Science and Technology                          | 2014 | 28(5) | 1961-1966 |
| 40 | Prospects and Threats to Jatropa Biodiesel as the Future Sustainable Fuel of India   | Energy Technology & Policy  | 2014 | 1     | 8-14      |
| 41 | An Experimental and Numerical Investigation of the Performance, Combustion and Emission Characteristics of a Diesel Engine fueled with Jatropa Biodiesel | Energy Procedia   | 2014 | 54    | 455-467   |

|    |  |  |      |         |              |
|----|--|--|------|---------|--------------|
| 42 | Effect of generator, condenser and evaporator Temperature on the Performance of Ejector Refrigeration System (ERS)                         | Journal of Basic and Applied Scientific Research   | 2014 | 1       | 4-9          |
| 43 | Combustion, Performance and emission Characteristics of Hydrogen as an Internal Combustion Engine fuel                                     | Journal of Aeronautical and Automotive Engineering | 2014 | 1       | 1-6          |
| 44 | Numerical simulation of natural convection in a square enclosure for different Rayleigh numbers  | International Journal of Energy & Technology       | 2014 | 6       | 1-19         |
| 45 | Effect of Methanol Addition to Diesel on the Performance and Emission Characteristics of a CI Engine                                       | Journal of Basic and Applied Scientific Research   | 2014 | 1(3)    | 8-13         |
| 46 | Numerical Prediction of effect of Nitrogen addition to fuel on soot formation in a diffusion flame   | Combustion Science and Technology                  | 2014 |         | Communicated |
| 47 | Numerical Investigation of the Effect of Reduced Gravity and Radiation on Temperature and NO Formation in Diffusion Flame                  | International Journal of Heat and Mass Transfer    | 2014 |         | Communicated |
| 48 | Laminar flow and heat transfer through a circular tube having integral transverse corrugations and fitted with centre-cleared twisted-tape | Exp Thermal Fluid Science                          | 2014 | 57      | 388-395      |
| 49 | Experimental investigation of laminar flow through a circular tube fitted with spiral corrugation and twisted tapes with oblique teeth     | Exp Thermal Fluid Science                          | 2014 | 57      | 301-309      |
| 50 | Laminar fluid flow and heat transfer through a circular tube having spiral ribs and twisted tapes  | Exp Thermal Fluid Science                          | 2014 |         | accepted     |
| 51 | Ultrasonic cavitation based processing of metal matrix nanocomposites: an overview   | Journal of Applied Mechanics and Materials         | 2014 |         | accepted     |
| 52 | Optimization of Spinal Implant Screw for Lower Vertebra through Finite Element Studies   | Journal of Long-Term Effects of Medical Implants   | 2014 | 24(2-3) | accepted     |

## List of Conferences

|   |   |   |   |                       |                          |
|---|---|---|---|-----------------------|--------------------------|
| 1 | Numerical Study of Cutting Fluid Flow through Sudden Contraction Nozzle with the help of Pressure Contours        | Proc. of 58th Congress of Indian Society of Theoretical and Applied Mechanics                   | Bengal Engineering and Science University, Shibpur, Howrah, West Bengal | 18-21 December , 2013 | Presented and published. |
| 2 | A 2-D Numerical Simulation on Flow and Pressure Characteristics for an Abdominal Aortic Aneurysm Model            | Proc. of 58th Congress of Indian Society of Theoretical and Applied Mechanics                   | Bengal Engineering and Science University, Shibpur, Howrah, West Bengal | 18-21 December , 2013 | Presented and published  |
| 3 | Study on Shear Flow Characteristics in a Stenosed Human Artery for Initiation and Progression of Atherosclerosis  | Proc. of 58th Congress Indian Society of Theoretical and Applied Mechanics                      | Bengal Engineering and Science University, Shibpur, Howrah, West Bengal | 18-21 December , 2013 | Presented and published  |
| 4 | Study on Flow Characteristics of Fluid Passing through Hybrid Diffuser with the help of Streamline Contours       | Proc. of 58th Congress of Indian Society of Theoretical and Applied Mechanics                   | Bengal Engineering and Science University, Shibpur, Howrah, West Bengal | 18-21 December , 2013 | Presented and published  |
| 5 | Computational Study of Fuel Dilution Effect on the Soot Formation in Methane-Air Laminar Confined Diffusion Flame | Proc. of the ASME 2013 International Mechanical Engineering Congress and Exposition (IMECE2013) | San Diego, USA  | 15-21 November, 2013  | Presented and published  |
| 6 | Numerical Simulations of Flow through Different Sudden Expansion Configurations                                   | Proc. of 22nd National and 11th International ISHMT-ASME Heat and Mass Transfer Conference      | IIT Kharagpur   | 28-31 December , 2013 | Presented and published  |

|    |  |  |   |                      |                         |
|----|--|--|---|----------------------|-------------------------|
| 7  | Production, Performance and Emissions of Biodiesel as Compression Ignition Engine Fuel   | Proc. of the ASME 2013 International Mechanical Engineering Congress and Exposition (IMECE2013)      | San Diego, USA                                | 15-21 November, 2013 | Presented and published |
| 8  | Effect of Injection Timing on the Performance and Emission Characteristics of a CI Engine using Diesel and Methyl Soyate                     | Proceedings of National Conference on Recent Advances in Mechanical Engineering (NCRAME)             | Nerist, Nirjuli                               | 2013                 | Presented and published |
| 9  | An Experimental and Numerical Investigation of the Performance and Emission Characteristics of a Diesel Engine fueled with Jatropa Biodiesel | IVth International Conference on Advances in Energy Research   | Indian Institute of Technology Bombay, Mumbai | December 10-12, 2013 | Presented and published |
| 10 | Numerical Investigation of Performance and Emission Characteristics of Biodiesels as Compression Ignition Engine Fuels                       | International Conference on Emerging Trends in Renewable Energy (ICETRE 2013)                        | Bhubaneswar, India                            | December 27-28, 2013 | Presented and published |
| 11 | Performance and Emission Characteristics of Methanol and Di-Methyl Ether as Spark Ignition Engine Fuel: A Review                             | International Conference on Emerging Trends in Renewable Energy (ICETRE 2013)                        | Bhubaneswar, India                            | December 27-28, 2013 | Presented and published |
| 12 | Experimental Study on the Performance and Emission Characteristics of a SI Engine Using Methanol as Fuel                                     | Proceedings of the 22th National and 11th International ISHMT-ASME Heat and Mass Transfer Conference | IIT Kharagpur, India                          | December 28-31, 2013 | Presented and published |

|    |  |  |                          |                       |                         |
|----|--|--|--------------------------|-----------------------|-------------------------|
| 13 | Thermodynamic Property formulation of Halogenated Hydrocarbon refrigerant Using Virial Coefficient Type Equation of State      | Proceedings of the 22th National and 11th International ISHMT-ASME Heat and Mass Transfer Conference | IIT Kharagpur, India     | December 28-31, 2013  | Presented and published |
| 14 | Numerical Study of the Radiation Effect on Thermal NO Formation in Diffusion Flame under Reduced Gravity Conditions            | Proceedings of the 22th National and 11th International ISHMT-ASME Heat and Mass Transfer Conference | IIT Kharagpur, India     | December 28-31, 2013  | Presented and published |
| 15 | Parametric and performance analysis of a naturally ventilated floriculture greenhouse using a thermal mode                     | Proceedings of International conference on Mechanical Engineering (ICME) 2013                        | BUET Dhaka, Bangladesh   | 20-21st June 2012     | Presented and published |
| 16 | Modeling and performance analysis of a solar collector supported desalination system coupled with multi-effect humidification  | International Conference on Emerging Trends in Renewable Energy(ICETRE)                              | Bhubaneswar              | 27-28 December 2013   | Presented and published |
| 17 | Analysis of an SPV integrated absorption refrigeration system for air conditioning of a greenhouse under hot and humid climate | Proceedings of the 22nd National and 11th International ISHMT-ASME Heat and Mass Transfer Conference | IIT Kharagpur, Kharagpur | 28-31st December 2013 | Presented and published |
| 18 | Modeling and analysis of a solar assisted absorption refrigeration system  | Proceedings of IVth International Conference on Advances in Energy Research                          | IIT Bombay, Mumbai       | 10-12th December 2013 | Presented and published |
| 19 | Isoparametric machining technique for trimmed free-form surface for CAD/CAM industry   | Proc. of Int. Conference on Computer Aided Engineering (CAE-2013)                                    | IIT Chennai              | 19-21 December, 2013  | 721-726                 |
| 20 | Optimization of input material parameters  | Proc. of Int. Conference on  | IIT Chennai              | 19-21 December        | 574-579                 |

|    |   |   |   |                          |                         |
|----|---|---|---|--------------------------|-------------------------|
|    | for Ohno-Wang hardening model using Genetic Algorithm   | Computer Aided Engineering (CAE-2013)   |   | , 2013                   |                         |
| 21 | Sensitivity analysis of Chaboche parameter for characterization of cyclic plasticity behaviour                  | Proc. of Int. Conference on Computer Aided Engineering (CAE-2013)   | IIT Chennai   | 19-21 December, 2013     | 465-470                 |
| 22 | Application of genetic algorithm in the calibration of Ohno Wang kinematic hardening model for SA333 C-Mn Steel | Proc. of 58th Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM 2013)  | BESU, Shibpur   | 18-21 December 2013      | Presented and published |
| 23 | Wire-EDM process modelling and optimization for machining pure Zirconium Diborite                               | National Conference on recent Advancement in Mechanical Engineering, Organized by Mechanical Engineering Department                                   | NERIST, Arunachal Pradesh                             | 8-9th November, 2013     | Presented and published |
| 24 | Morphological and Kinematic aspects of Human Spine – as Design Inputs for developing Spinal Implants            | National Conference on Mechanical Engineering (NCMERP – 2013)   | Birbhum Institute of Engineering and Technology, Suri | February 2nd – 3rd, 2013 | Presented and published |
| 25 | Process Capability – A Surrogate Measure of Process Robustness: A Case Study                                    | Proceedings of the ASME 2013 International Design Engineering Technical Conferences under 18th Design for Manufacturing and the Life Cycle conference | Portland, Oregon, USA                                 | August 4-7, 2013         | Presented and published |
| 26 | A Study on Process Capability Indices in Forging and Hardening and  | 3rd International Conference on Production and Industrial   | Dr B. R. Ambedkar National Institute of               | March 29-31, 2013        | Presented and published |



|    |   |   |                                    |                             |                               |
|----|---|---|------------------------------------|-----------------------------|-------------------------------|
|    | Tempering Processes   | Engineering<br>(CPIE2013)   | Technology<br>Jalandhar,<br>Punjab |                             |                               |
| 27 | Optimization of<br>Process Parameters<br>in Centerless<br>Grinding Operation<br>using Response<br>Surface Methodology               | International<br>Conference on<br>Precision, Meso,<br>Micro and Nano<br>Engineering<br>(COPEN-8:)         | NIT Calicut,<br>Kerala             | December<br>13-15,<br>2013  | Presented<br>and<br>published |
| 28 | Numerical<br>investigation of<br>gravity effect on the<br>temperature and flow<br>fields in a methane<br>air diffusion flame        | Proceedings of the<br>International<br>Conference on<br>Mechanical<br>Engineering 2013<br>(ICME2013)      | Dhaka,<br>Bangladesh               | 20 – 21<br>June,<br>2014    | Presented<br>and<br>published |
| 29 | A computational<br>study of the effect of<br>fuel dilution and air-<br>preheating on soot<br>formation in<br>diffusion flame        | Proceedings of the<br>International<br>Conference on<br>Mechanical<br>Engineering 2013<br>(ICME2013)      | Dhaka,<br>Bangladesh               | 20 – 21<br>June,<br>2014    | Presented<br>and<br>published |
| 30 | Effect of<br>Compression Ratio<br>on the Performance,<br>Combustion and<br>Emission from a<br>Diesel Engine Using<br>Palm Biodiesel | Proceedings of the<br>6th BSME<br>International<br>Conference on<br>Thermal<br>Engineering<br>(ICTE 2014) | Dhaka,<br>Bangladesh               | 19-21<br>December<br>, 2014 | Accepted                      |
| 31 | Numerical<br>Investigation on the<br>Effects of EGR on CI<br>Engine<br>Characteristics Using<br>Soyabean Biodiesel                  | Proceedings of the<br>6th BSME<br>International<br>Conference on<br>Thermal<br>Engineering<br>(ICTE 2014) | Dhaka,<br>Bangladesh               | 19-21<br>December<br>, 2014 | Accepted                      |
| 32 | Numerical<br>Simulation of Vapour<br>Compression<br>Refrigeration System<br>Using Refrigerant<br>R152a, R404A, R507<br>and R600a    | Proceedings of the<br>6th BSME<br>International<br>Conference on<br>Thermal<br>Engineering<br>(ICTE 2014) | Dhaka,<br>Bangladesh               | 19-21<br>December<br>, 2014 | Accepted                      |
| 33 | Effect of Exhaust<br>Gas Recirculation<br>(EGR) on the<br>Performance and<br>Emission<br>Characteristics in                         | Proceedings of the<br>6th BSME<br>International<br>Conference on<br>Thermal<br>Engineering                | Dhaka,<br>Bangladesh               | 19-21<br>December<br>, 2014 | Accepted                      |

|    |   |  |                         |                                  |                         |
|----|---|--|-------------------------|----------------------------------|-------------------------|
|    | Diesel Engine   | (ICTE 2014)  |                         |                                  |                         |
| 34 | Thermal modeling and economical analysis of a solar desiccant assisted distributed fan-pad ventilated floriculture greenhouse | Proceedings of ICME 2014 World Congress on Engineering                   | Imperial College London | 2-4th July 2014                  | Presented and published |
| 35 | Solar desiccant assisted distributed fan pad evaporative cooling of a greenhouse for hot and humid climate                    | International Conference on Renewable Energy and Sustainable Development | Pune                    | 9-10 <sup>th</sup> January, 2014 | Accepted                |

**Seminar / Workshops / Conferences / Training programme organized by the department (in last year)**

The Department organised a two days workshop on “Product Development: Concepts, Methods and Applications (WPD 2014)” on 17-18<sup>th</sup> November 2014.



*Department of  
Metallurgy and Materials  
Engineering*



## **ABOUT THE DEPARTMENT:**

The Department of Metallurgy and Materials Engineering started its journey at the Bengal Engineering College in 1939 as Department of Metallurgy, Chemistry and Geology with the introduction of a three year degree course in Metallurgy under the Calcutta University. Bengal Engineering College is one of the oldest engineering institutions in India and the department is the second oldest metallurgy department of the country. The duration and syllabus of the course changed time to time and presently it is offering a 4-year 8-semester course for B.E. degree in Metallurgy and Materials Engineering. The name of the department also changed to Department of Metallurgy and Materials Engineering to widen the scope of education with sea change progress in the field of materials from the erstwhile Department of Metallurgy.

In 1953 the Department introduced a 2-year Postgraduate degree programme in Physical Metallurgy which, after changes time to time, is presently a 4-semester course at the All India level offering the degree in Metallurgy and Materials Engineering with specialization in Physical Metallurgy. It may be mentioned that this department was the first to introduce a postgraduate course in metallurgy in this country.

Prof. N. N. Sen who later became Principal of the College, was the first Professor and Head of the then Department of Metallurgy, Chemistry and Geology which subsequently were separated in 1965 and the department of Metallurgy started journey on its own.

In 1949, Prof. W. Baukhloh of Technische Hochschule, Berlin joined the Department as a Professor of Metallurgy and many foreign trained faculties joined the Department during this long period. There was a spurt in the research activity in the Department since 1949 particularly after Dr. A. K. Seal joined the Department in 1955 after completing his Ph.D in Sheffield University.

In 2000, the department started a 5 semester self sponsored part time post graduate course in Industrial Metallurgy on approval from AICTE in 1999 with intake strength of 15 plus reservation as per rules, which subsequently converted to a 6-semester course. The course is catering the metallurgy / mechanical engineers with B.E. degree and having at least 2 years experience with the aspiration of getting post graduate degree and classes are being held in the evening after working hours and on holidays. The department was the only one to introduce such a course in the field of Metallurgy against a circular from AICTE in 1995 seeking to open such courses.

Over the years the Department has produced a good number of eminent metallurgists working with distinction in India and abroad who have made significant contribution in the fields of Metallurgy and Materials Engineering. The Department has,

so far, produced good number of Ph.Ds, and several Ph.D. programmes are running in the Department.

This Department has always been very active in incorporating the recent trends in the fields of Metallurgy and Materials Engineering and in evolving suitable means for effective technology transfer to the existing industries. The Department has already pioneered in the development of certain important steels and alloys like HSLA steels, maraging steels, shape memory alloys etc. These developments have had a tremendous impact on the total development of the subject in the national scenario and by this it has contributed significantly to the cause of Metallurgy and Materials Science of India today. The Department has always worked with inadequate resources but still has achieved academic distinction. All efforts have been successful solely due to excellent interaction with industries, institutions and research houses created by a band of devoted faculty members. The department feels proud to announce its collaborative ventures with organisations like TISCO, SAIL, ISRO, BARC, NML, ICDC, NMRL, INSDAG.

The Department is now actively engaged in modernizing the existing laboratories along with the development of newer ones in accordance with the current trends in Metallurgy and Materials Science. The department has been receiving aids towards Modernization of various Laboratories as well as in the form of Sponsored Research Grants from various sources. This has enabled us to consolidate the undergraduate and postgraduate training the research in Metallurgy and maintain our tradition as one of the leading centers for metallurgical education and research in the country. During the Golden Jubilee celebration of the Department in 1989-1990, M/s. M. N. Dastur & Co. showed its affection towards the Department by advancing funds for Research on Materials Science and Engineering. Further, Tata Steel Chair Professor was instituted during the same year by an endowment of Tata Steel to lead advanced research and consultancy work. Ministry of Steel, Govt. of India has introduced Steel Chair Professor and this department is also a beneficiary of this scheme.

The Department to-day is thus in a position to undertake various advanced research and consultancy work in various field, to fulfill the vision of those who were pioneer in establishing and in nurturing the Department. A vigorous Ph.D. programmes continues in the Department and at present, 15 numbers of Ph.D. candidates are pursuing their Ph.D programmes. Faculty members of the Department also received awards, medals, fellowships from Government of India and other professional bodies. Some faculty members are also pursuing collaborative programmes with foreign universities.

## ACADEMIC PROGRAMMES:

### Undergraduate Level

I. Degree offered : B.E. Degree in Metallurgy and Materials Engineering

II. Sanctioned students intake: 30

III. Additional intake through other program (i.e. QIP) Nil

### Post Graduate Level

I. Degree offered : 4-semester M.E. Degree in Metallurgy and Materials Engineering

II. Sanctioned students intake: 7

III. Additional intake through other program (i.e. QIP) Nil

IV. Specializations in Physical Metallurgy

I. Degree offered: 6-semester M.E. degree in Industrial Metallurgy

II. Sanctioned intake: 15 plus reservation as per rules

### Doctoral and Post Doctoral Research Programme

I. Degree offered : PhD in Metallurgy and Materials Engineering

II. No. of candidates enrolled: 12

III. No. of candidates registered: 03

IV. No. of candidates awarded: Nil

## FACULTY POSITION:

Sanctioned faculty post: **14**

Vacant Post: **4**

### Faculty profile

#### Permanent:

| Name                       | Designation                  | Highest Qualification | Specialisation/ Research Area   | Contact No.<br>E-mail:  |
|----------------------------|------------------------------|-----------------------|---|---|
| <u>Sanjoy Sadhukhan</u>    | Associate Professor and Head | M.Tech                | Physical Metallurgy, Materials Characterization, Mechanical testing, Heat treatment | 033-2668-4561 to 63<br>skhan_besus@yahoo.co.in  |
| <u>S. Chatterjee</u>       | Professor                    | Ph.D                  | Microalloyed Steel, Advance joining technique                                       | 033-2668-4561 to 63<br><a href="mailto:schatterjee@metal.becs.ac.in">schatterjee@metal.becs.ac.in</a>                 |
| <u>A. Basumallick</u>      | Professor                    | Ph.D.                 | Nanostructured Materials, Electronic and Magnetic materials                         | 033-2668-4561 to 63<br>(ext- 240)<br><a href="mailto:abasumallick@metal.becs.ac.in">abasumallick@metal.becs.ac.in</a> |
| <u>P. P. Chattopadhyay</u> | Professor                    | Ph.D.                 | Phase Transformation  | 033 2668-4561 to 63<br><a href="mailto:ppc@metal.becs.ac.in">ppc@metal.becs.ac.in</a>                                 |
| <u>Swarup Kr. Ghosh</u>    | Professor                    | Ph.D.                 | Phase Transformation, Ferrous and non-ferrous alloys, ANN modelling                 | (033) 26684561 to 63,<br><a href="mailto:skghosh@metal.becs.ac.in">skghosh@metal.becs.ac.in</a>                       |



|                      |                     |        |  |   |
|----------------------|---------------------|--------|--|---|
|                      |                     |        | study  |   |
| <u>Sumit Ghosh</u>   | Associate Professor | M.Tech | Development and Characterization of in situ metal matrix nanocomposites                  | 033 2668-4561 to 63<br>g_sumit@becs.ac.in                   |
| <u>Manojit Ghosh</u> | Associate Professor | Ph.D.  | TMSof Aluminium Alloys<br>Texture study<br>Powder Metallurgy of self lubricating bearing | 033-2668-4561 to 63<br><u>manojit_ghosh1@rediffmail.com</u> |
| <u>Debdulal Das</u>  | Assistant Professor | Ph.D.  | Phase Transformation<br>Wear of Materials<br>Nanomaterials & Nanocomposites              | 033-2668-4561 to 63<br>debdulal_das@metal.becs.ac.in        |
| Sukumar Kundu        | Assistant Professor | Ph.D.  | Advance Joining technique, Corrosion and Wear resistance materials,                      | 033-2668-4561 to 63<br>skundu@metal.becs.ac.in              |
| Tapendu Mandal       | Assistant Professor | M,Tech | Electronic Materials, Composite Materials  | 033-26684561 to 63<br>tapendu@gmail.com                     |

#### **Others:**

| <b>Name</b>            | <b>Designation</b>         | <b>Highest Qualification</b> | <b>Specialisation/ Research Area</b>      | <b>Contact No. E-mail:</b> |
|------------------------|----------------------------|------------------------------|---|----------------------------|
| <u>P. S. Banerjee</u>  | Adjunct Professor          | Ph.D                         | Extractive metallurgy, Foundry, Corrosion | psban_2000@yahoo.co.in     |
| H. S. Ray              | Adjunct Professor          | Ph.D.                        | Extractive Metallurgy                     | hs_ray@yahoo.com           |
| U. K. Chatterjee       | Adjunct Professor          | Ph.D.                        | Corrosion                                 | uday_chatterjee@yahoo.com  |
| Nikhiles Bandyopadhyay | Tata Steel Chair Professor | Ph.D.                        | Steel Making and Characterization         | nbandyo@hotmail.com        |
| Mr. Ramanath Dutta     | Visiting Faculty           | M. Tech.                     | Electronics                               | 9830374001                 |

#### **AWARDS AND LAURELS:**

1. Prof. S. K. Ghosh received best Paper Award, MMED of IE(I), 2013,
2. Prof. P. P. Chattopadhyay Received NMD Award “Metallurgist of the Year – 2013” from the Ministry of Steel, Govt. of India

#### **AREAS OF RESEARCH**

- High strength low alloy steel
- Ultra low carbon bainitic steel
- Ultra high strength steel
- Dual phase steel
- Nano Materials
- Shape memory alloys
- Diffusion bonding

- Friction of Stir Welding
- Metal matrix composite
- Texture of metal and alloys
- Aluminum based alloy

## **RESEARCH FACILITY:**

Upgradation of Research facilities in the The Department of Metallurgy and Materials Engineering is a continuous process for creating a better environment for academics and research. A number of new equipment and instruments are acquired regularly for various laboratories, pertaining to rapidly expanding research horizons. A major research area for materials development and characterization comprises the broad fields of Metallography and Optical and Electron microscopy laboratories, the X-ray laboratory and the Differential Scanning Calorimetry (DSC) laboratory. The Physical Metallurgy laboratory, which has traditionally been the most important one in the Department, consists of an adequate sample preparation section, including Electro-polishers; a number of heat treatment furnaces with programmable control; high temperature (1700°C) furnaces capable of powder sintering. The

The optical microscopy section has been modernised with a number of Research grade microscopes with micro-hardness testing facility. The Scanning Electron Microscope with EDS system has given a new impetus to advanced research. For research in the field of Mechanical Metallurgy, the department has one Instron Testing machine. A laboratory scale Rolling mill, various hardness testers, Impact testing machine etc. are the other facilities in this area.

Recent additions have been made to augment the gamut of research areas. The Wear Testing facility enables investigations in the field of Tribology. Researches have been in progress in the field of nano-structured materials, produced by different routes. Planetary Ball Mills have been installed for the mechanical alloying route for powders. A device for evaluating magnetic properties of materials is another notable addition in the field of research on new materials. The X-ray diffraction unit for phase identification and the Differential Scanning Calorimeter for characterization are the important facilities, which are now used intensively for meaningful research.

The Department also has a computer laboratory with internet connectivity, which shall induce further in researches on simulation and modelling.

Procurement of several other equipments, which is in the pipe line, shall further boost the research capability of the Department in near future.

The Department can boast of a rich tradition of research, mostly with practical and industrial applications. Sponsored and Collaborative projects have been taken up and completed for organisations like Bhabha atomic Research Centre (BARC), Indian Space Research Organisation (ISRO), UGC, AICTE, Ministry of Steel, Govt. of India, Ministry of Defence, Govt. of India, Defence Research and Development Laboratory, Naval Research Laboratory etc.

The important Projects of the Department are mentioned in a separate section to give a glimpse of the wide range of vigorous research activity of the faculty members of the small but dynamic Department.

## **Instrument and Equipment facilities:**

- Air Induction furnace for melting of steel
- Heat Treatment Furnaces (up to 1700C), Sintering furnace
- Jominy Hardenability Testing unit
- Grinding and Polishing facilities, Electropolisher
- Optical Microscopes, including Research microscopes (Carl Zeiss, Leica)
- Hardness Testers
- Micro-hardness Testers (Leica & Reichart)

- Scanning Electron Microscope (Jeol) with EDS facility (Oxford)
- Differential Scanning Calorimeter
- Instron Testing machines - Static
- Charpy Impact Testing machine
- Diffusion bonding set-up for joining dissimilar metals
- X-ray Diffraction unit ((Philips)
- X-ray Diffraction unit ((Bruker)
- Planetary Ball Mill for nano-material preparation and Mechanical alloying
- Wear Testing machine
- Computer laboratory
- Magnetic hysteresis measuring device
- Friction stir welding Machine
- Wear Testing Machine

## **NAME OF THE LABORATORIES**

- Metallographic Laboratory
- Heat Treatment Laboratory
- Corrosion Laboratory
- X-ray Laboratory
- SEM Laboratory
- Melting and casting
- Foundry Laboratory
- Smithy Laboratory
- welding Laboratory
- Computer Laboratory
- Nanostructure processing Laboratory

## **CONSULTANCY WORK**

- ❖ “Stainless Steel for Construction Segment” – sponsored by INSDAG – PI: Prof. S. Sadhukhan
- ❖ “Welding & Fabrication of Steel work” – sponsored by INSDAG – PI: Prof. M. Ghosh, Co-PI: Prof. S. Sadhukhan
- ❖ “Brand Ambassador of PMC Prestige TMT Bar” – sponsored by Purulia Metal Casting (P) Ltd. – PI: Prof. S. Sadhukhan
- ❖ “Deformation and Damage Behavior of Automobile Grade Steels under Cyclic Loading” – sponsored by Tata Steel – PI: Prof. D. Das
- ❖ “Development of High Strength Multi-phase steels through various processing conditions” – sponsored by Tata Steel – PI: Prof. S. K. Ghosh

**SUPPORT STAFF POSITION:**

Technical Staff: 10 (full time)

1 (contractual)

Supporting Staff: 7 (full time) for laboratory

2 (full time) for dept. office

Clerical Staff: NIL

(i) Sanctioned technical post

(ii) Technical staff profile

| <b>Technical staff</b>    |                     |   |                    |
|---------------------------|---------------------|---|--------------------|
| <b>Name</b>               | <b>Designation</b>  | <b>Highest Qualification</b>                    | <b>Contact No.</b> |
| Sri Salil Kr. Dalui       | Tech. Asst. II      | BE (Met.Eng.)                                   | 09831435065        |
| Sri Swapan Kr. Jana       | Tech. Asst. II      | Diploma (Mech.)                                 | 09231791660        |
| Sri Santanu Chattopadhyay | Supdt. Tech         | Diploma (Mech.)                                 | 09830229800        |
| Sri Rash Behari Nayak     | Supdt. Tech         | Diploma (Mech.) & Adv. Diploma in Foundry Tech. | 09231828193        |
| Sri Jayanta Kr. Chandra   | Supdt. Tech         | Diploma (Mech.) & Adv. Diploma in Foundry Tech. | 09433739104        |
| Sri Sujit Kr. Roy         | Supdt. Tech         | Non-Matriculate                                 | 09143469096        |
| Sri Bagala Prasad Patra   | Tech. Asst. II      | H.S. & NCVT                                     | 09635860758        |
| Sri Ranjit Karmakar       | Workshop Instructor | Non-Matric                                      | 09433609711        |
| Sri Rupchand Naskar       | Workshop Instructor | ITI   | 07872331640        |
| Sri Srikanta Adak         | Workshop Instructor | ITI   | 09143757199        |
| Sri Syamal Chakrabarty    | Contractual         | A. Sc.  |                    |
| <b>Support Staff</b>      |                     |   |                    |
| Sri Ashoke Kumar Das      | Senior Peon         | Class VIII Passed                               | 9830484398         |
| Sri Provat Kr. Choudhury  | Helper Gr. – I      | Class VIII Passed                               | 9007590108         |
| Sri Yeasin Mullick        | Turner & Fitter     | Madhyamik Appeared                              | 09433393053        |

|                       |                 |                   |            |
|-----------------------|-----------------|-------------------|------------|
| Sri Tarak Nath Dey    | Junior Peon     | Madhyamik Passed  | 9830788505 |
| Sri Manoj Bhagat      | Junior Peon     | Class V Passed    | 9163728807 |
| Sri Hiru Kumar Majhi  | Hammerman       | Class VIII Passed | -----      |
| Sri Biswanath Dorjee  | Junior Durwan   | Class VIII Passed | 9007960365 |
| Sri Badal Chandra Das | Helper Gr. - II | Class V Passed    | 9433212531 |
| Sri Debasish Mondal   | Junior Durwan   | Class I Passed    | 8902183415 |

### Sponsored Research Project :

#### Ongoing

- Friction Stir welding of dissimilar materials sponsored by Tata steel.
- Development of 2000MPa steel for defense application sponsored by MSF, OBF
- Development of diffusion bonded joints between Titanium alloy and micro-duplex stainless steel with intermediate, sponsored by Science and Engineering Research Board (SERB),
- Influence of Ag-Sn on microstructure and texture in Al-Zn-Mg alloys, sponsored by UGC

### INDUSTRY-INSTITUTE INTERACTION

- Colorado School of Mines, Golden, USA
- University of Queensland, Australia
- University of New South Wales, Sydney, Australia
- Australian National University, Australia
- Tata Steel, Jamshedpur
- IISc Bangalore
- IIT Kharagpur
- IIT Kanpur
- NML, Jamshedpur
- Jadavpur University

### NO OF PUBLICATIONS:

#### Details of Journal publication 2013-2014

1. M. Ghosh, A. Miroux, L.A.I. Kestens, "Correlating r-value and through thickness texture in Al-Mg-Si alloy sheets", *Journal of Alloys and Compounds* 619 (2015) 585–591.
2. A.K. Rathore, S.P. Pati, A. Roychowdhury, M. Ghosh, D. Das, "Structural, optical, hyperfine and magnetization studies of ZnO encapsulated  $\alpha$ -Fe nanoparticles", *Materials Research Bulletin*, xxx (2014) 566–571, Accepted for publication.
3. M. Ghosh, P.S. Banerjee and H.S. Ray, "Examining Energy and Environment Issues in Non-ferrous Metallurgy in the Light of Industrial Metabolism", *Journal of Materials and Environmental Science* 5 (2) (2014) 380-389

4. Manojit Ghosh, A. Miroux, R.J. Werkhoven, P.J. Bolt and L.A.I. Kestens, "Warm Deep-drawing And Post Drawing Analysis of Two Al-Mg-Si Alloys", *International Journal of Materials Processing Technology*, 214, 2014, 756-766
5. Manojit Ghosh, P.S. Banerjee and H.S. Ray, "Environmental Pollution Due to Gaseous Emissions During Non-ferrous Extraction Processes", *Russian Journal of Non-Ferrous Metals*, 55(3), 2014, 263-269
6. S. Sadhukhan, M. Kundu, M. Ghosh, "Effect of Trace Added Sn on Mechanical Properties of Al-Zn-Mg alloy", *Advanced Materials Research Journal*, 828 (2014) pp 73-80.
7. S Chatterjee, A.Basu Mallick: Challenges in manufacturing Al based metal matrix nanocomposite via stir casting route, *Materials Science Forum* 736,2013, 72-80.
8. S Chatterjee, A Sinha, D Das, S Ghosh, A Basumallick: Microstructure and mechanical properties of Al/Fe aluminide in-situ composite prepared by reactive stir casting route, *Materials Science and Engineering: A*, 578,2013,6-13.
9. BN Mondal, A Basumallick, DN Nath, PP Chattopadhyay: Solubility and magnetic properties enhancement in bi-phase nanostructure Cu-Fe-Mn alloy, *Journal of Magnetism and Magnetic Materials*,341, 2013, 40-44.
10. S. Kundu, S. Sam, B. Mishra and S. Chatterjee: Diffusion Bonding of Microduplex stainless steel and Ti alloy with and without interlayer: Interface microstructure and strength properties, *Metallurgical and Materials Transactions A* 2014, 45(1), 371-383.
11. S.M. Bhola, S Kundu, R. Bhola, B Mishra, S. Chatterjee, 'Electrochemical Study of Diffusion Bonded Joints between Micro-duplex Stainless Steel and Ti6Al4V Alloy, *Journal of Materials Science & Technology*, 2014, 30(2), 163-171.
12. Gopinath T. , S. Kundu, B. Mishra and S. Chatterjee, Effect of Bonding Time on Interfacial Reaction and Mechanical Properties of Diffusion-Bonded Joint Between Ti-6Al-4V and 304 Stainless Steel Using Nickel as an Intermediate Material, *Metallurgical and Materials Transactions A*, 2014, 45(4) pp. 2078-89.
13. Gopinath T. , S. Kundu, B. Mishra and S. Chatterjee, "Effect of bonding temperature on interfacial reaction and mechanical properties of diffusion bonded joint between Ti-6Al-4V and 304 stainless steel using nickel as an intermediate material", *Metallurgical and Materials Transactions A*, 2014, 45(4), pp. 2067-77.
14. R. Bhola, S. Kundu, F.M. Alabbas, C. Chandra, B. Mishra, D.L. Olson, "Corrosion Response of Ti6Al4V and Ti15Mo Dental Implant Alloys in the presence of Listerine Oral Rinse" *International Journal of Corrosion*, Vol. 2013, 2014(2), pp 1-7.
15. S. Kundu, S. M. Bhola, B. Mishra and S. Chatterjee, Structure and properties of solid state diffusion bonding of 17-4PH stainless steel and titanium, *Materials Science and Technology*,2014, 30 (2), 163-171
16. SM Bhola, S. Kundu, F. Alabbas, B. Mishra, D.L. Olson, 'An electrochemical study on chlorhexidine gluconate addition to normal saline for oral implant applications, *Int. J. Electrochem. Sci*, 2013, 8, 5172-5182.
17. S. Kundu, B Mishra, D. Olson, S Chatterjee, Interfacial reactions and strength properties of diffusion bonded joints of Ti64 alloy and 17-4PH stainless steel using nickel alloy interlayer, *Materials & Design*, 2013, 51(10), 714-722.
18. S. Kundu, R. Bhola, D Roy, D Bhattacharjee, B Mishra, S Chatterjee Microstructure and tensile strength of friction stir welded joints between interstitial free steel and commercially pure Aluminium, *Materials & Design*, 2013, 50, 370-375.

**Seminar/ workshops/Conferences/Training programme organized by the department(in last year)**

1. International Conference on Corrosion Control in Infrastructure, Pipeline, RCC Structure and Automobile (CCIPRA 2014)-28<sup>th</sup> Feb. to 1<sup>st</sup> March 2014.
2. National Seminar on Microstructure of Materials-12 and 13 March 2014.

**Technology Developed / Innovations**

**Advancements under TEQIP – Phase II**

- \* X-ray Diffractometer of Bruker

**Foreign visits and Invited Lectures**

**Visitors to your Department ( Indian & Foreign):**

- \* Dr. Manojit Dutta – Tata Steel, as INAE-AICTE Professor

**Alumni Contribution to your Department**

**Training and Placement**

**Extension Activities and Societal outreach**

- \* 6-semester part time M.E. degree in Industrial Metallurgy for the practicing Engineers in Metallurgy and Mechanical by the Department
- \* 3-semester Certificate course on Steel Making and Rolling Technology sponsored by NISST, Govt. of India by the Department
- \* Prof. S. Sadhukhan acted as Co-ordinator, publication of results of National Talent Search Examination and National Merit cum Means Examination on behalf of Govt. of West Bengal

**New Academic / Research Initiatives**

**Academic Collaboration**

**Industrial Collaboration**

*Department of  
Mining Engineering*





## About the department

Department of Mining Engineering Bengal Engineering and Science University, Shibpur, was established in the year 1906. This department is the oldest mining engineering department in this country. Both under graduate and post graduate courses are being offered by this department, also this department is an approved QIP centre for post –graduate studies. The department also runs the course on M.tech in Geoinformatics The placement, at present, is hundred percent. Faculties of this department are involved in interdisciplinary research activities. There is significant number of research projects in the last few years which, so far, produced several PhD scholars, and also, at present, number of research scholars is also pursuing their PhD programmes. The major research areas of the faculty members are : Remote sensing and GIS applications, mine safety, workload assessment with physiological performance evaluation of miners, Environmental aspects of mining , Geo- mechanics , Mine closure policy design , Environmental modeling , Coalbed methane and Carbon sequestration. Mineral beneficiation. The major sources of funding of these research projects are DST, UGC, AICTE, MOEF, ISRO, World Bank, and BP International. A number of research publications have come out of these intensive research endeavors by the faculty members.

### Academic Programmes :

## Undergraduate Level

|   |                            |
|---|----------------------------|
| Degree offered  | B.E. in Mining Engineering |
| Sanctioned students intake  | 30                         |
| Additional intake through lateral entry in 3 <sup>rd</sup> Semester | 3                          |

### Post graduate Level

|   |  |
|---|--|
| Degree offered  | M.E. in Mining Engineering<br>M.Tech in Geoinformatics |
| Sanctioned students intake                            | 18 (M.E. in Mining), 18 (M.Tech in Geoinformatics)     |
| Additional intake through other programmes (i.e. QIP) | Nil  |
| Specialisations in                                    | Mining Engineering<br>Geoinformatics                   |

## Doctoral Level

|                            |                            |
|----------------------------|----------------------------|
| Degree offered             | Ph.D in Mining Engineering |
| No. of candidates enrolled | -12                        |
|                            | Registered-12              |
|                            | Awarded                    |

**Faculty position :**

Sanctioned faculty post 12 Vacant Post 3  
Faculty profile (in the following table)

| Name     | Designation      | Highest Qualification | Specialisation/Research Area                                   | Contact No<br>E-mail   |
|----------|------------------|-----------------------|--|------------------------|
| S. Sinha | Professor & Head | PhD                   | Mine Environment, Mine Planning & Design and Mineral Economics | suranjan1980@gmail.com |

|                |                     |        |   |  |
|----------------|---------------------|--------|---|--|
| P.K.Paul       | Professor           | PhD    | Metal Mining. GIS and Remote Sensing                                  | <a href="mailto:Prabirpaul59@gmail.com">Prabirpaul59@gmail.com</a>               |
| N.C.Dey        | Professor           | PhD    | Coal Mining. U/G mining machinery Safety & Legislation and Ergonomics | <a href="mailto:ncdey@mining.iests.ac.in">ncdey@mining.iests.ac.in</a>           |
| I.N.Sinha      | Professor           | PhD    | Surface Mining, Mine Environment Science and Management               | <a href="mailto:indranaths@mining.iests.ac.in">indranaths@mining.iests.ac.in</a> |
| P.Dutta        | Professor           | PhD    | Rock Mechanics and Coal Bed Methane(CBM)                              | <a href="mailto:dutta.pratik@gmail.com">dutta.pratik@gmail.com</a>               |
| S.Mukhopadhyay | Assistant Professor | PhD    | Mineral Dressing and Bulk Material Handling                           | <a href="mailto:sudipta1973@yahoo.com">sudipta1973@yahoo.com</a>                 |
| A. Ghosh       | Assistant Professor | PhD    | Mine Planning   | <a href="mailto:apurnag2000@yahoo.com">apurnag2000@yahoo.com</a>                 |
| G .C.Roy       | Assistant Professor | PhD    | Coal Mining, Mining Machinery And Optimization Techniques             | <a href="mailto:gcroy_besus@yahoo.co.in">gcroy_besus@yahoo.co.in</a>             |
| Md.M.Islam     | Assistant Professor | M.Tech | Mining Pollution control and Management                               | <a href="mailto:miraj77@gmail.com">miraj77@gmail.com</a>                         |

#### **Awards and Laurels:**

J.G. Kumarmangalam award to Prof. N.C.Dey

#### **Research area**

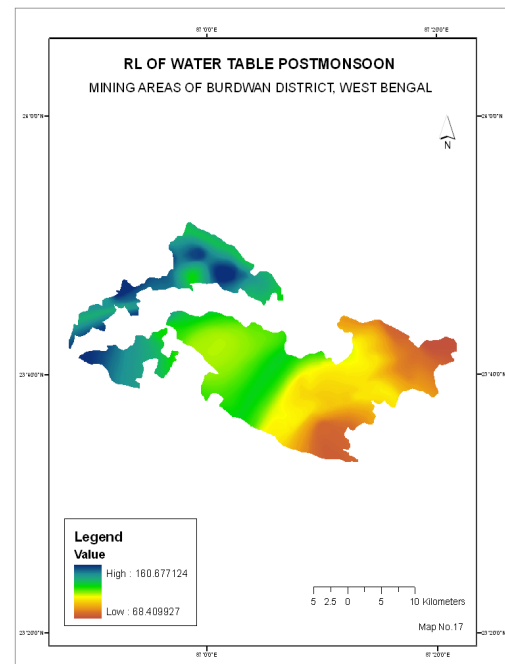
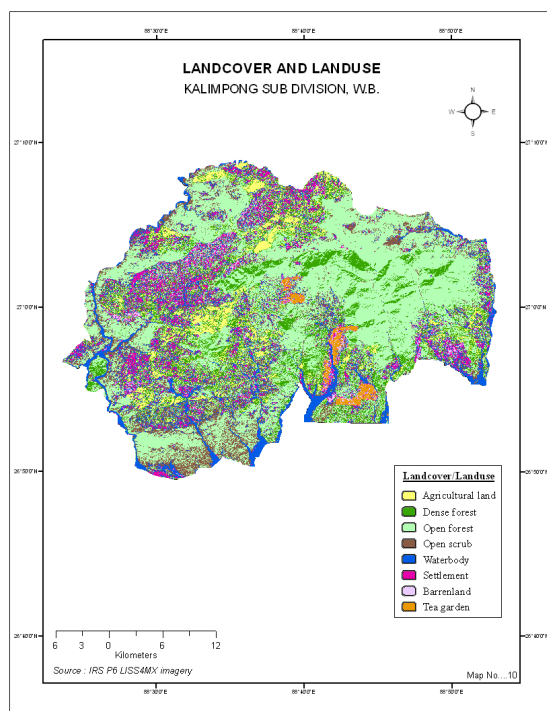
1. GIS and Remote Sensing
2. Ergonomics and Safety
3. Coal Bed Methane
4. Rock Mechanics
5. Mine Planning
6. Ventilation Planning
7. Mineral Beneficiation

#### **Research facilities :**

|   |
|---|
| GIS and Remote Sensing : The department has well established GIS and Remote Sensing research laboratories. The facilities include GIS software's like ARCMAP, ILWIS, GEOMEDIA etc. and Remote Sensing software's like ERDAS, ENVI etc. The department has AO scanner, AO plotter, workstations, handheld GPS and other associated software. |
| Safety and Ergonomics: The department has a good infrastructure for research and consultancy in the field of safety and ergonomics. The infrastructure include Oxylog consumption monitor, whole body vibration meter, hand arm vibration meter, mobile heart rate monitor. Asman Hygrometer etc  |
| Coal bed Methane :  |
| Rock Mechanics : The department has well established rock mechanics laboratory which includes, UTM, Rock drilling and cutting machines, Shear testing apparatus, Triaxial set up and software necessary for analysis.   |
| Mine Planning: The department uses SURPAC and MINEX software for mine planning and design.  |
| Survey : The department has well established survey laboratory. The equipment in lab includes, total station, electronic theodolite, DGPs and single frequency GPS.   |

**Name of the laboratories:**

|  |   |
|--|---|
| <b>Mine Survey Laboratory</b>            | <ol style="list-style-type: none"> <li>1. Dual frequency GNSS Receivers for DGPS survey</li> <li>2. Single frequency GNSS receivers for DGPS survey</li> <li>3. Hand held GPS</li> <li>4. Robotic Total Station</li> <li>5. Total Station</li> <li>6. Electronic Theodolite</li> <li>7. Levels</li> <li>8. LISSCAD software</li> <li>9. Ski Pro software</li> </ol> |
| <b>Computer Laboratory</b>               | <ol style="list-style-type: none"> <li>1. PC's</li> <li>2. Server</li> <li>3. Surpac</li> <li>4. Minex</li> <li>5. RocScience</li> </ol>  |
| <b>Coal sequestration Laboratory</b>     |   |
| <b>Rock Mechanics laboratory</b>         | <ol style="list-style-type: none"> <li>1. 100 ton UTM</li> <li>2. Rock drilling and cutting machine</li> <li>3. Rock permeability testing setup</li> <li>4. Shear box test setup</li> <li>5. Triaxial test setup</li> </ol>   |
| <b>GIS and Remote Sensing laboratory</b> | <ol style="list-style-type: none"> <li>1. ARCMAP 11 (3 users)</li> <li>2. ERDAS 2011 (5 users)</li> <li>3. Envi 5.0 (10 Users)</li> <li>4. Geomedia Professional</li> <li>5. Raster to vector software</li> <li>6. ILWIS</li> <li>7. Modflow</li> <li>8. A0 Scanner</li> <li>9. A0 Plotter</li> <li>10. Servers</li> <li>11. Workstations</li> </ol>                |
| <b>Mineral Dressing Laboratory</b>       | <ol style="list-style-type: none"> <li>1. Jig Based Pilot Plant</li> <li>2. Hydrocyclone test rig</li> <li>3. Jaw crusher</li> <li>4. Raymond Mill</li> <li>5. Pulverizer</li> </ol>  |
| <b>Safety and Ergonomics Laboratory</b>  | <ol style="list-style-type: none"> <li>1. Oxygen consumption monitor (Oxylog)</li> <li>2. Whole body vibration meter</li> <li>3. Hand arm vibration meter</li> <li>4. Mobile heart rate monitor(Polar)</li> <li>5. ECG, Asman Hygrometer</li> <li>6. TMT</li> <li>7. Globe thermometer</li> <li>8. Goniometer(digital + axis)</li> </ol>                            |
| <b>Mine Ventilation Laboratory</b>       | <ol style="list-style-type: none"> <li>1. Blast vibration measuring Instrument</li> <li>2. Gravimetric Dust Sampler</li> <li>3. Gas Chromatograph</li> <li>4. Rescue Apparatus</li> <li>5. Crossing Point Apparatus</li> <li>6. High volume air sampler</li> </ol>  |







### **Consultancy Work**

1. Geotechnical study of rock and gassiness determination for Moonidih U/G coal mines.
2. Geotechnical properties of rock mass and top soil for the Bomi iron ore project of Liberia by Western Clusters Ltd.
3. Analysis and Interpretation of stress cell and Exensometer data collected at Sharda Highwall mining project of South Eastern Coal fields Ltd. unders Cuprum Bagrodia Ltd.

### **Support staff position :**

Sanctioned technical post: 5

Technical staff profile (in the following table)

| Name              | Designation             | Highest Qualification | Contact No. | E-mail |
|-------------------|-------------------------|-----------------------|-------------|--------|
| Prasanta Gope     | Tech-Asst-(Gr-I)        | Diploma in Mining     |             |        |
| Janardan Kar      | Tech-Asst-(Gr-II)       | Diploma in Mining     |             |        |
| Amitava Chowdhury | Tech-Asst-(Gr-II)       | Diploma in Mining     |             |        |
| Saibal Ghosh      | Sr. Instrument Mechanic | I.T.I                 |             |        |
| Gobardhan Nayak   | Sr.Record supplier      | VIII Passed           |             |        |
| Sanjoy Ghosh      | Jr.Durwan               | 10 +2 Passed          |             |        |



**Sponsored Research :**

| Ongoing                | Sponsoring agency |
|------------------------|-------------------|
| Ergonomics             | DST               |
| Mine closure           | MOEF              |
| Environment            | DST               |
| Mineral Dressing       | UGC               |
| GIS and Remote Sensing | MOEF              |
| Ergonomics             | UGC               |
| Coal Bed Methane       | DST               |

**Industry – Institute Interaction****No. of publications : (This year only)**

|            |   |
|------------|---|
| Journal    | 8 |
| Conference | 8 |

**Seminar/Workshops/Conferences/Training programme organized by the department (in last year).**

1. 23<sup>rd</sup> National Convention of Mining Engineers and National Seminar on Development of coal and mineral resources- Economic, Technological, and environmental issues, on the subject





*Department of Physics*



## About the department

The department of Physics has a century old past and has come through the era of revolutionary thoughts in the world of physics to the present century of technological revolution. As far back in 1926, Prof. Satyendra Nath Bose and Prof. Meghnad Saha, then post graduate students of Calcutta University used to come to this department to study original works of Max. Planck and Albert Einstein. Our library was so rich even at that time under the able leadership of Prof. Bruhl. They also used to do their M.Sc. practical in the laboratory of this physics department. An unforgettable name in the history of the department is Prof. S.S. Boral, who initiated the course on Electronics and Telecommunications which itself finally branched out to be one of the advanced engineering department of the university. Our department can justifiably feel proud of eminent teachers like Prof. P.K. Chattopadhyay, Prof. B.R. Gupta, Prof. N.C. Mukherjee, Prof. M. Mitra and others who taught the undergraduate engineering students of B.E. College and made a strong base for their further studies. Our present faculty members are also faithfully tracing their paths.

The year 2000 was a landmark for our department when the M.Sc. course in Applied Physics was introduced. New faculty members started joining the department, having expertise in modern thrust areas of physics and related technology. On the one hand, theoretical works are being pursued in the field of *Nuclear and High energy physics* and *Atomic and Molecular physics*; on the other hand in view of latest technological advancement, different studies are carried out in the field of *Fiber Optics*, *Electroceramics*, *Spectroscopy of Laser and Luminescent materials*, *Transport phenomena in solids*, *Synthesis of Nanomaterials by sol gel route and their characterization*, *Silicon nanostructure based : Light emitters, Detectors, Sensors etc.* At the same time, experimental works are undertaken creating a rich environment of advanced research. In the last five years the faculty members of the department have contributed more than 100 research papers in international journals of repute and international conference proceedings. Many of our students are engaged in research and some of them are also in scientific jobs in various premier research institutions of India, such as SINP, IACS, TIFR, BARC, IPR, CGCRI etc. A considerable number of them are pursuing Ph.D. programme in the department itself.

### Academic Programmes:

#### Undergraduate Level

|                    |  |
|--------------------|--|
| Degree offered and | BE (Physics course for 1 <sup>st</sup> , 2 <sup>nd</sup> semesters (all) 3 <sup>rd</sup> Semester (EE and ME)) |
|--------------------|--|

|                             |                   |
|-----------------------------|-------------------|
| Sanctioned students' intake | 500 approximately |
|-----------------------------|-------------------|

Additional intake through lateral entry in 3<sup>rd</sup> Semester

#### Post Graduate Level

|   |                  |
|---|------------------|
| Degree offered  | M.Sc. in Physics |
| Sanctioned students' intake                           | 25               |
| Additional intake through other programmes (i.e. QIP) | nil              |
| Specialisations in                                    | Material Physics |

## Doctoral & Post Doctoral Research Programme

Degree offered: PhD (Engineering / Science / Humanities & Management Science) :

No of Candidates enrolled : 8  
No. of Candidates registered: 6  
No. of Candidates awarded: 2

1. Joyee Basu (under the sole supervision of Dr. Debasis Ray)

2. Krisanu Chatterjee (under the supervision of Prof. Dipali Banerjee and Prof. Kajari Kargupta,(J.U.))

### Faculty Position:

Sanctioned faculty post .....14..... Vacant Post ...2( 1 for Gen.+1 for ST)...

Faculty profile (in the following table )

| Name                      | Designation            | Highest Qualification | Specialization / research area  | Contact No. E-mail   |
|---------------------------|------------------------|-----------------------|---|--|
| Dr.Sukhendusekhar Sarkar  | Professor              | M.Sc., Ph.D           | Nuclear Physics<br>Nuclear Structure & Nuclear Astrophysics                       | ss@physics.becs.ac.in  |
| Dr. Bichitra Kr. Guha     | Professor              | M.Sc., M.Phil., Ph.D  | Solid State Physics<br>Electroceramics  | bkg@physics.becs.ac.in   |
| Dr.(Mrs.) Dipali Banerjee | Professor              | M.Sc., M.Phil., Ph.D  | Solid State Physics<br>Transport properties of solids                             | <a href="mailto:dipalibanerjeebesu@gmail.com">dipalibanerjeebesu@gmail.com</a><br>dbanerjee@physics.becs.ac.in |
| Dr. Sampad Mukherjee      | Asso. Professor & Head | M.Sc., Ph.D           | Solid State Physics<br>Synthesis and characterization of nano materials           | smukherjee0309@yahoo.com<br>smukherjee.besu@gmail.com  |
| Dr. Mousumi Basu          | Professor              | M.Sc., M.Tech., Ph.D  | Fibre Optics in linear and nonlinear domain                                       | mbasu@physics.becs.ac.in,<br>mousumi_basu@yahoo.com  |
| Dr. Samar Jana            | Asso. Professor        | M.Sc., Ph.D           | Spectroscopy of Laser and Luminescent materials                                   | samarjana@yahoo.com,<br>sjana@physics.becs.ac.in   |
| Dr. Debasis Ray           | Asstt. Professor       | M.Sc., Ph.D           | Theoretical Atomic Physics<br>Atomic Physics in Plasmas, Laser-atom interactions, | dray@physics.becs.ac.in  |

|                           |   |                     |  |                                     |
|---------------------------|---|---------------------|--|-------------------------------------|
|                           |   |                     | Spectroscopy of confined quantum systems, Many-body techniques in atomic physics.                  |                                     |
| Dr. S. M. Hossain         | Asstt. Professor  | M.Sc., Ph.D         | Optoelectronic Materials & Devices<br>Nanostructure based Photonics, Photovoltaics and , Sensors.  | shminhaz@physics.becs.ac.in         |
| Dr. Krishnendu Mukherjee  | Asstt. Professor  | M.Sc., Ph.D         | High Energy Physics,   | kmukherjee@physics.becs.ac.in       |
| Dr. Amit Kundu            | Asstt. Professor  | M.Sc., Ph.D         | High Energy Physics, Cosmology   | amitkundu@physics.becs.ac.in        |
| Mr. Abhijit Bisoi         | Asstt. Professor  | M.Sc.               | Experimental nuclear structure and nuclear astrophysics  | 9830629051<br>abijitbisoi@gmail.com |
| Dr. Mojammel Haque Mondal | Asstt. Professor  | M.Sc., Ph.D         | Experimental condensed matter physics  | 9432180899<br>mojamelm@gmail.com    |
| Dr. Abhijit Majumdar      | Asstt. Professor (UGC-FRP)                                      | M.Sc., M.Tech, Ph.D | *Plasma Physics,<br>*Plasma Surface Interaction,<br>*Transport properties of transition metal ions | 8902781531<br>majuabhijit@gmail.com |
| Dr. Manish Pal Chowdhury  | Asstt. Professor (UGC-FRP)                                      | M.Sc., Ph.D         | Carbon nanotubes, Graphene, Nanoelectronics and Nanoscience  | manishpc@gmail.com                  |
| Dr. Sukhen Das            | Asso. Professor of Jadavpur University (UGC special programme ) | M.Sc., Ph.D         | Nano-materials/biophysics  | sukhenddas29@gmail.com              |

**Awards and Laurels received by the faculty members : -**

**Research area:**

- Nuclear structure and nuclear astrophysics
- High energy physics
- Quantum field theory at finite temperature and density
- Synthesis & characterization of thermoelectric nanomaterials and composites
- Magnetic properties of materials
- Characterization of Fuel cells & its components
- Preparation & characterization of oxide glass by sol-gel route

- Spectroscopic investigation on rare earth and transition metals in search of LASER materials.
- Fluorescence and phosphorescence study of rare earth materials.
- Design and optimization of optical fibers for dense WDM system.
- Nonlinear pulse propagation through single mode optical fibers.
- Atomic Physics in Plasmas, Laser-atom interactions.
- Spectroscopy of confined quantum systems, Many-body techniques in atomic physics.
- Nanostructure based Photonics, Photovoltaics and, Sensors.
- Processing and characterization of electroceramic materials used as capacitor dielectrics, sensors and actuators etc.
- Experimental and Theoretical (Large Basis Shell Model (LBSM) and Particle Rotor Model (PRM) Calculation) studies of nuclear structure properties in the mass A~40, A~ 100 and A~150 regions.
- Theoretical studies of nuclear structure in the space above and below  $^{132}\text{Sn}$  core.
- Preparation and Characterization of implanted target.
- Study of structural aspects, chemical kinetics and interfacial properties of the ultrathin films
- Plasma surface interaction,
- Plasma on biomedical application.
- Transport property of transition metal ions
- Carbon nanotubes, Graphene, Nanoelectronics and Nanoscience
- Nano-materials/biophysics

**Research facilities: (name specific equipment / picture, infrastructure etc)**

|   |
|---|
| 1. Microprocessor controlled 1800 <sup>0</sup> C box furnace                  |
| 2. Hydraulic pressing machine.  |
| 3. Hp LCR Meter   |
| 4. Spectrophotometer (UV-Visible)   |
| 5. Luminescence Spectrometer  |
| 6. Electric Furnace (1400 <sup>0</sup> C)                                     |
| 7. IBM- Z pro work station  |
| 8. Dell T7500 work station  |
| 9. Ultrasonic PULSER/RECEIVER instruments (MAKE- MATEC INC.).                 |
| 10. Magnetic susceptibility measurement                                       |
| 11. Closed cycle liquid helium cryostat                                       |
| 12. Vacuum coating unit   |
| 13. Magnet with power supply  |
| 14. GM Counter and radioactive sample with lead shield                        |
| 15. Thermal conductivity measurement set up                                   |
| 16. Z-scan instrument for measuring nonlinear properties of optical materials |
| 17. Linear stage setup for pulling fiber from micro to nano dimensions        |
| 18. Spin coating unit   |
| 19. High precession Ammeter and source meter                                  |
| 20. NaI detector with multichannel analyser                                   |

**Name of the laboratories:**

|    |  |
|----|--|
| 1. | Synthesis and Characterization Of Oxide Glass Laboratory |
| 2. | LASER and Luminescent Materials Research Laboratory      |
| 3. | Material Research Laboratory                             |
| 4. | Fiber Optic Design Laboratory                            |
| 5. | Electroceramics Laboratory                               |

**Laboratories for PG & UG studies**

|    |                                    |
|----|------------------------------------|
| 1. | General and electronics laboratory |
| 2. | Optics laboratory                  |
| 3. | Solid state laboratory             |
| 4. | Nuclear physics laboratory         |
| 5. | UG general laboratory              |

**Support staff position:****Support staff position:**

(i) Sanctioned technical post : 3

(ii) Technical staff profile (in the following table)

| Name                     | Designation  | Highest Qualification | Contact No. | E-mail                     |
|--------------------------|--------------|-----------------------|-------------|----------------------------|
| Dr. Bibhas Ch, Mitra     | TA-II        | Ph.D                  | 9434715128  | bcmitra@yahoo.com          |
| Mr. Amal Kr. Mandal      | TA-II        | M.Sc.                 | 9830586320  | akm627@yahoo.co.in         |
| Mr. Sintu Das            | TA-II        | B.Sc.                 | 9903262750  | -                          |
| Mr. Amiya Kr. Paul       | Junior Peon  | H.S.                  | 9433819077  | amiyaamrita_01@yahoo.co.in |
| Mr. Asim Das Chakraborty | Junior Asst. | M.A.                  | 9433126999  |                            |

**Ongoing Sponsored Research / projects:**

|  |                             |
|--|-----------------------------|
| <b>1. Accelerator And Radiation Based Collaborative Research Scheme CRS Project Using DAE Facilities:</b><br><br><u>Title of the Project:</u> Study of isomers in HO and other neighbouring nuclei<br><br>PI: Sukhendusekhar Sarkar ( in collaboration with SINP | UGC-DAE CSR, Kolkata Centre |
|--|-----------------------------|



|   |   |
|---|---|
| and IUC-DAEF, CC)<br>Rs: 500000/-   |   |
| 2. Fabrication and characterization of optical nano and micro fiber (OFNM).<br>PI: Dr. S. Mukherjee<br>Co PI: Dr. M. Basu<br><br>Proj cost : Rs. 25.44 Lakhs<br>Starting from Aug 2012  | DAE / BRNS  |
| 3. Generation of silent green energy with performance and efficiency enhancement using inorganic/organic hybridization and nano structuring in fuel cell system.<br>P.I : Dr. Dipali Banerjee ( in collaboration with J.U)<br>Rs. 38,90,000/- | DST, Govt. of India   |
| 4. Synthesis and characterization of low dimensional Bi-Te for thermoelectric application<br>Co P.I : Dr. Dipali Banerjee ( in collaboration with J.U)<br>Rs. 36,90,800/-   | DST, Govt. of India   |
| 5. “Solar Photovoltaic Hub at BESU”<br>Co-P.I. - Dr. Syed Minhaz Hossain in collaboration with Center of Excellence for Green Energy and Sensor Systems, BESU, Rs. 8.5 crore (Ongoing)  | DST   |
| 6. “Advanced research on thin silicon solar cell and PV systems”<br>Co-P.I. - Dr. Syed Minhaz Hossain in collaboration with Center of Excellence for Green Energy and Sensor Systems, BESU, Rs. 13 crore (Ongoing)                            | MNRE  |
| 8. Non-Thermal Plasma application on blood coagulation and skin diseases treatment”<br><b>Principal Investigator:</b> Dr. Abhijit Majumdar, IEST, Shibpur<br><br>Co-PI- Dr. Pradip Mitra, SSKM Hospital, Kolkata, W.B.                        | Approved by Board of Research on Fusion Science and Technology (BRFST), September, 2014 |

## Details of publications of each faculty member (2013 – 14)

### Journal

1. **"Graphene supported bimetallic G-Co-Pt nanohybrid catalyst for enhanced and cost effective Hydrogen generation"** S Saha, V Basak, A Dasgupta, S Ganguli, **D Banerjee**, K Kargupta, International Journal of Hydrogen Energy (Accepted)
2. **"Hydrogen Storage on Graphene using Benkeser Reaction"** Ananta Kr Sarkar, Shubhanwita Saha, Saibal Ganguly **Dipali Banerjee** and Kajari Kargupta International Journal of Energy Research 2014 (In press) (accepted on 23<sup>rd</sup> March).
3. **"Analysis of drying and dilution in phosphoric acid fuel cell (PAFC) using galvanometric study and electrochemical impedance spectroscopy"** Tanmoy Paul, Mrinal Seal, **Dipali Banerjee**, Saibal Ganguly, Kajari Kargupta, Pabitra Sandilya, *J. Fuel Cell Sci. Technol* 11(4) (Feb 27, 2014) 041001.
4. **"Thermoelectric performance of electrodeposited nanostructured polyaniline doped with sulfo-salicylic acid"** Krishanu Chatterjee, Mousumi Mitra, Saibal Ganguly, Kajari Kargupta and **Dipali Banerjee**, Journal of Applied Polymer Science 131 (4) (2014) 39920.
5. **"Synthesis, characterization and enhanced thermoelectric performance of structurally ordered cable-like novel polyaniline–bismuth telluride nanocomposite"** Krishanu Chatterjee, Mousumi Mitra, Kajari Kargupta, Saibal Ganguly and **Dipali Banerjee** Nanotechnology 24 (2013) 215703 (10pp).
6. **"Reduction of graphene oxide through a green and metal-free approach using formic acid"** Mousumi Mitra, Krishanu Chatterjee, Kajari Kargupta, Saibal Ganguly, **Dipali Banerjee** Diamond & Related Materials 37 (2013) 74–79.
7. **"Reduced Order Inferential Model based Optimization of Phosphoric Acid Fuel Cell (PAFC) Stack"** Ganguly Saibal, Das Sonali, Kargupta Kajari, **Banerjee Dipali**, Industrial & Engineering Chemistry Research 52 (22) (2013) 7104–7115.
8. **"Morphology dependent ammonia sensing with 5-sulfosalicylic acid doped nanostructured polyaniline synthesized by several routes"** Krishanu Chatterjee, Palash Dhara, Saibal Ganguly, Kajari Kargupta, **Dipali Banerjee**, Sensors and Actuators B 181 (2013) 544– 550.
9. **Non-collective states in  $^{122}\text{Te}$**  by S. Nag, P. Singh, K. Selvakumar, A. K. Singh, **Abhijit Bisoi** et., al., Eur. Phys. J. A **49**, 145 (2013).
10. **Superdeformation and  $\alpha$ -cluster structure in  $^{35}\text{Cl}$**  by **Abhijit Bisoi**, M. Saha Sarkar, **S. Sarkar** et., al Phys. Rev. C **88**, 034303 (2013).
11. **High spin spectroscopy in  $^{34}\text{Cl}$**  by **Abhijit Bisoi**, M. Saha Sarkar, **S. Sarkar** et., al, Phys. Rev. C **89**, 024303 (2014).
12. **Collective excitations in  $^{33}\text{S}$**  by **Abhijit Bisoi**, M. Saha Sarkar, **S. Sarkar** et., al, Phys. Rev. C **90**, 024328 (2014).
13. **Shape coexistence in the near-spherical  $^{142}\text{Sm}$  nucleus** by S. Rajbanshi, **Abhijit Bisoi** et., al., Phys. Rev. C **89**, 014315 (2014).
14. **Multiple magnetic rotational bands based on proton alignment in  $^{143}\text{Eu}$**  by S. Rajbanshi, **Abhijit Bisoi** et., al., Phys. Rev. C **90**, 024318 (2014).
15. **Study of density-dependent swelling of ultrathin water soluble polymer films**, **Mojammel H. Mondal** and M. Mukherjee, J Polym Res 21, 343 (2014)
16. **Heat transport in a three dimensional slab geometry and the temperature profile of Ingen-Hausz's experiment**, Shiladitya Acharya and **Krishnendu Mukherjee**, Int. J. Mod. Phys., B 27, 1350057 (2013)

17. **Nonlinear pulse reshaping in a designed erbium-doped fiber amplifier with a multicladded index profile**, Navonil Bose, Dipankar Ghosh, Sampad Mukherjee, Mousumi Basu, Optical Engineering, 52, 086104 (2013).
18. **GeO<sub>2</sub> nanorods: synthesis, structural and photoluminescence properties**, Navonil Bose, G S Taki, Mousumi Basu and Sampad Mukherjee, Materials Research Express, 1, 045013 (2014).
19. **Suppression of fine-structure splitting and oscillator strength of sodium D-line in a Debye plasma**, Joyee Basu and Debasis Ray, Physics of Plasmas 21, 013301 (2014) [American Institute of Physics]
20. **Possibility of giant enhancement of low-frequency non-resonant Rayleigh scattering by atomic systems within dense plasmas**, Joyee Basu and Debasis Ray, Physics of Plasmas 21, 032709 (2014) [American Institute of Physics]
21. **"Electronic bond structure of carbon nitride thin film deposited by HiPIMS and dc magnetron plasma"- Abhijit Majumdar**, Sadhan Chandra Das, Vitaslav Stranak, Rainer Hippler, Journal of Coating Science and Technology (Accepted, 2014)
22. **"Electronic and chemical property of amorphous carbon, hydrocarbon, hydrogenated/hydrogen free carbon nitride: spectroscopic study"** Sadhan C. Das, Abhijit Majumdar, R. Hippler, International Journal of Innovation Science and Research (Accepted, 2014)
23. **Development of fast heating electron beam annealing setup for ultra high vacuum chamber**, Sadhan C. Das, Abhijit Majumdar, Sumant Katiyal, T. Shripathi, R. Hippler, Rev. Sci. Instrument 85, 025107 (2014)
24. **Structural difference in hydrogenated carbon nitride and carbon nitride: Shake up satellites and fluorescence phenomena**, Abhijit Majumdar, S. C. Das, J. Heinecke, R. Hippler, Surface Science 609, 53 (2013)
25. **Role of nitrogen in optical and electrical band gap of hydrogenated/hydrogen free carbon nitride**, Abhijit Majumdar, S. Mukherjee, R. Hippler, Thin solid film 527, 151(2013)
26. **Role of nitrogen in evaluation of sp<sup>2</sup>/sp<sup>3</sup> and optical band gap of hydrogenated carbon nitride: Raman spectroscopy**, Abhijit Majumdar, S C Das, R. Hippler, Vibrational Spectroscopy 66 63-68 (2013)
27. **"Single walled carbon nanotube-borosilicate glass composit as broadband near infrared emitter for multifunctional photonic application"** Arnab Ghosh, Sujan Ghosh, Sukhen Das, Probal K. Das and R. Banerjee, Chemical Physics Letters 570, 113-117, 2013.
28. **"In situ synthesis and antibacterial activity of copper nano particle loded natural montmorillonite clay based on contact inhibition and ion release"**, Biswajoy Bagchi, Subrata Kar, Sumit Kr. Dey, Suman Bhandary, Debasis Roy, Tapas Kr. Mukhopadhyay, Sukhen Das, Papiya Nandy, Colloids and Surfaces B: Biointerfaces, 108, 358-365, 2013
29. **"Study of densification of sol-gel derived mullite due to excess iron, nickel and copper ions."**Debasis Roy, KumaresHaldar, Biplab Kumar Paul, BiswajoyBagchi, Alakananda Bhattacharya, Sukhen Das, PapiyaNandy. Ceramics – Silikáty, Date of acceptance: October 6 2013, 57 (2013), 219-224.
30. **"A comparative study of densification of sol-gel derived nano-mullite due to the influence of iron, nickel and copper ions."** Debasis Roy, Biswajoy Bagchi, Sukhen Das, Alakananda Bhattacharjee and Papiya Nandy, International Journal of Applied Ceramic Technology, (DOI: 10.1111/ijac.12114), 1-7, 2013.
31. **"Reduced Activation Energy of Iron and copper ion Doped Mullite which can be Used as a Substrate in Electronic Industry."** Debasis Roy, KumaresHaldar, Biplab Pal, Alakananda Bhattacharya, Sukhen Das, and Papiya Nandy, Journal of Surface Engineered Materilas and Advance Technology, 3, pp. 11-17, 2013.

32. **"Electrical and dielectric properties of TiO<sub>2</sub> and Fe<sub>2</sub>O<sub>3</sub> doped fly ash."** Debasis Roy, Parveen Sultana, Subhajit Ghosh, **Sukhen Das**, and Papiya Nandy. Bull. Mater. Sci., Vol. 36, No. 73, pp. 1225-1230, 2013.
33. **"Experimental evaluation of synergistic action between antibiotic and the antipsychotic antimicrobial triflupromazine."** Debnath S, Palchoudhuria S, Chatterjee N, Pal. T.K, **Das S** and Dastidar S. G. International Journal of Microbiology Research, Vol. 5, Issue 4, pp. 430-434, 2013.
34. **"Experimental studies on synergism between meropenem and sulbactam"** Sayanti Mukherjee, Shaswati Chaki, T.K. Pal, **Sukhen Das** and Sujata G. Dastidar, African Journal of Microbiology Research, Vol. 7(27), pp 3461-3465, 2013
35. **"Magnetic and enhanced microwave absorption properties of nanoparticles of Li<sub>0.32</sub>Zn<sub>0.26</sub>Cu<sub>0.1</sub>Fe<sub>2.32</sub>O<sub>4</sub> encapsulated in carbon nanotubes"** S. Sutradhar, **S. Das** and P.K. Chakrabarty, Materials letters 95, pp145-148, 2013
36. **"Modulated Magnetic property, enhanced microwave absorption and Mossbauer spectroscopy of Ni<sub>0.40</sub>Zn<sub>0.40</sub>Cu<sub>0.20</sub>Fe<sub>2</sub>O<sub>4</sub> nanoparticles embedded in carbon nanotubes"** S. Sutradhar, K. Mukhopadhyay, S. Pati, **S. Das**, D. Das and P.K. Chakrabarty Journal of Alloys and Compounds 576, pp126-133, 2013
37. **"Evaluation of Antimicrobial potentiality of a Flavonoid, Isolated from the leaf of the plant colebrookea oppositifolia"** Santosh Kr. Mahapatra, Musfique Mookerjee, Debalina Sinha Roy, Prithviraj Karak, **Sukhen Das**, Sujata G. Dastidar, International Journal of Biological & Pharmaceutical Research, 4(4), 225-230, 2013.
38. **"Characterization of newly synthesized zinc sulphide nanoparticles by simple aqueous chemical method and determination of its antimicrobial activity against various pathogenic bacterial strains"** Sutapa Ganguly, Parvin Sultana, **Sukhen Das**, Sujata G. Dastidar, International Journal of Biological & Pharmaceutical Research, 4(5), 377-381, 2013
39. **"Evaluation of Antimicrobial Effects of synthesized Zinc Sulphide Nanoparticles and Their Potentiation by the Anticancer Drug Imatinib"** Sutapa Ganguly, Subhajit Ghosh, **Sukhen Das**, Sujata G. Dastidar, International Journal of Phytopharmacology, 4(4), 266-271, 2013
40. **"Near infrared fluorescence an enhanced electrical conductivity of single walled carbon nanotube-lead silicate glass composite."** Arnab Ghosh, Sujana Ghosh, **Sukhen Das**, Probal K. Das, Jonaki Mukherjee, Rajat Banerjee, Journal of Non-Crystalline Solids 385 (2014) 129-135.
41. **Effect of vanadic anhydride and copper oxide on the development of hard porcelain composite and its antibacterial activity.** Arpan Kool, Pradip Thakur, Biswajoy Bagchi, Ujjwal Rajak, Tania Das, Subrata Kar, Gopal Chakraborty, T.K. Mukhopadhyay, **Sukhen Das**, Journal of Asian Ceramic Societies, Date of acceptance: 16 June 2014, DOI: 10.1016/j.jascers.2014.06.004
42. **"In situ synthesis of environmentally benign montmorillonite supported composites of Au/Ag nanoparticles and their catalytic activity in the reduction of p-nitrophenol."** Biswajoy Bagchi, Pradip Thakur, Arpan Kool, **Sukhen Das**, Papiya Nandy, RSC advances, DOI: 10.1039/C4RA11108G.
43. **"Abrupt change in dielectric properties due to titanium and strontium incorporation in mullite by sol-gel method."** Biplab Kumar Paul, Debasis Roy, Biswajoy Bagchi, Alakananda Bhattacharya, **Sukhen Das**, Kumaresh Halder, Journal of Advanced Ceramics, Date of acceptance: 7 July 2014
44. **"Dielectric switching above a critical frequency occurred in iron mullite composites used as an electronic substrate."** Biplab Kumar Paul, Kumaresh Halder, Debasis Roy, Biswajoy Bagchi, Alakananda Bhattacharya, **Sukhen Das**, J Mater Sci: Mater Electron, DOI 10.1007/s10854-014-2291-6, 2014
45. **"Enhanced broadband microwave reflection loss of carbon nanotube ensheathed Ni-Zn.Co-ferrite magnetic nanoparticles"** Debarghya Sarkar,

- Alakananda Bhattacharya, Papiya Nandy and **Sukhen Das**, Materials letters 120, pp259-260, 2014.
46. **“Copper Ion Doped Mullite Composite in Poly (vinylidene Fluoride) Matrix: Effect on Microstructure, Phase Behavior and Electrical Properties.”** Kumaresh Halder, Biplab Kumar Paul, Biswajoy Bagchi, Alakananda Bhattacharya and **Sukhen Das**, Journal of Research Updates in Polymer Science, 3, 157-169, 2014,
  47. **“Effect of Hydroxyapatite nanrod on chickpea (*Cicer arietinum*) plant growth and its possible use as nano-fertilizer.”** Niranjana Bala, Anindita Dey, **Sukhen Das**, Ruma Basu and Papiya Nandy, Iranian Journal of Plant Physiology, Vol(4), No (3)
  48. **“Synthesis and characterization of copper doped zinc oxide nanoparticles and its application in energy conversion.”** Poonam Bandyopadhyay, Anindita Dey, Ruma Basu, **Sukhen Das**, Papiya Nandy, Current Applied Physics, 14 (2014) 1149-1155.
  49. **“Enhancement of  $\beta$  phase crystallization and dielectric behavior of kaolinite/halloysite modified poly (vinylidene fluoride) thin films.”** Pradip Thakur, Arpan Kool, Biswajoy Bagchi, **Sukhen Das**, Papiya Nandy, Applied Clay Science, DOI: 10.1016/j.clay.2014.06.025. Date of acceptance: 11 June 2014
  50. **“Distinct Antimicrobial Effects of Synthesized ZnS nanoparticles Against Twelve Pathogenic Bacterial Strains”** Sutapa Ganguly, **Sukhen Das**, Sujata Ghosh Dastidar, Open Science Repository Chemistry, [doi.dx.doi.org/10.7392/Chemistry.70081948], 2014.
  51. **“Study of antimicrobial effects of the anticancer drug oxaliplatin and its interaction with synthesized ZnS nanoparticles”** Sutapa Ganguly, **Sukhen Das**, Sujata Ghosh Dastidar, International Journal of Pharmacy & Therapeutics, 5(3), 230-234, 2014
  52. **“Synthesis and characterization of Cu/Ag nanoparticle loaded mullite nanocomposite system: a potential candidate for antimicrobial and therapeutic application.”** Subrata Kar, Biswajoy Bagchi, Banani Kundu, Suman Bhandary, Ruma Basu, Papiya Nandy, **Sukhen Das**, BBA - General Subjects, Date of acceptance 15 May 2014.
  53. **“In silico study of potential autoimmune threats from rotavirus infection.”** Tapati Sarkar, **Sukhen Das**, Papiya Nandy, Rahul Bhowmick, Ashesh Nandy. Computational Biology and Chemistry, Date of acceptance: June 2014.
  54. **“Role of Carbon nanotubes on load dependent micro hardness of SWCNT-lead silicate glass composite.”** S. Ghosh, A. Ghosh, T. Kar, **S. Das**, P. K. Das, J. Mukherjee, R. Banerjee, Ceramics International 40 (2014) 2953-2958
  55. **“Effect of Different Potencies of Nanomedicine Cuprum metallicum on membrane Fluidity – a Biophysical Study.”** Ghosh S, Chakraborty M, **Das S**, Basu R, Nandy P, ACCEPTED PAPER: American journal of homeopathic medicine (AJHM). Accepted 2014.
  56. **Tapered silicon nanopillars for enhanced performance thin film solar cells**, Avra Kundu, Sonali Das, **S. M. Hossain**, Swapan K. Datta, Hiranmay Saha, Energy Procedia, accepted for publication (2014)
  57. **Selective Manhole Methane Sensing by Pd-modified Nanostructured Porous Silicon.** Subhasis Pradhan, **Syed Minhaz Hossain**, Jayoti Das, International Journal of Modern Sciences and Engineering Technology (IJMSET), Vol. 1, Issue 6, 2014 pp. 10-14

## Conference Proceedings

1. **High spin states in  $^{33}\text{S}$  by Abhijit Bisoi et., al.,** Proc. Int. DAE-BRNS Symp. Nucl. Phys. (India) **58**, 266 (2013).
2. **Superdeformation and alpha-cluster structure in  $sd$  shell nuclei by Abhijit Bisoi, M. Saha Sarkar and S. Sarkar.** To be published in the Proceedings of CIPSA 2013, The 9th International Conference in Subatomic Physics and Applications held in Constantine-1 University, Algeria from September 30th to October 2nd 2013.
3. **Measurement of Intrinsic Neutron Detection Efficiency of a Liquid Scintillator using Digital Data Acquisition System by Abhijit Bisoi et., al.,** Proc. Int. DAE-BRNS Symp. Nucl. Phys. (India) **58**, 998 (2013).
4. **Characterisation of  $^{22}\text{Ne}$  implanted target by  $^{22}\text{Ne}(p,)^{23}\text{Na}$  resonance reaction by Abhijit Bisoi, et., al.,** Proc. Int. DAE-BRNS Symp. Nucl. Phys. (India) **58**, 936 (2013).
5. **Bulk characterisation of  $^{14}\text{N}$  implanted target using Resonance reaction and SIMS measurements by Abhijit Bisoi et., al.,** Proc. Int. DAE-BRNS Symp. Nucl. Phys. (India) **58**, 996 (2013).
6. **Neutron detection by Pulse Shape Discrimination and Time of Flight techniques by Anirudh Chandra, Dibyadyuti Pramanik, Abhijit Bisoi et., al.,** Proc. Int. DAE-BRNS Symp. Nucl. Phys. (India) **58**, 938 (2013).
7. **High spin states in  $^{33}\text{S}$  by Abhijit Bisoi, S. Ray, D. Pramanik, R. Kshetri, S. Nag, K. Selvakumar, P. Singh, A. Goswami, S. Saha, J. Sethi, T. Trivedi, B. S. Naidu, R. Donthi, V. Nanal, R. Palit, S. Sarkar and M. Saha Sarkar,** Proc. Int. DAE-BRNS Symp. Nucl. Phys. (India) **58**, 266 (2013).
8. **Spectroscopy of  $N = 90$   $^{160}\text{Yb}$  by A. Saha, T. Bhattacharjee, D. Banerjee, S. R. Banerjee, S. Rajbanshi, Abhijit Bisoi et., al.,** Proc. Int. DAE-BRNS Symp. Nucl. Phys. (India) **58**, 180 (2013).
9. **Understanding Nuclei in the upper  $sd$ -shell by M. Saha Sarkar, Abhijit Bisoi, S. Ray, R. Kshetri and S. Sarkar,** AIP Conf. Proc. 1609, 95 (2014).
10. **Confirmation of a prolate structure for  $^{153}\text{Ho}$ , Dibyadyuti Pramanik, M Saha Sarkar, S. Sarkar,** Proc. of the DAE Symp. on Nucl. Phys. 58 (2013) 302
11. **Shell Evolution in Neutron-Rich Nuclei, Maitreyee Saha Sarkar and Sukhendusekhar Sarkar; Same as in (3.).**
12. **Pairing and shell evolution in neutron rich nuclei, Maitreyee Saha Sarkar, Sukhendusekhar Sarkar,** Fission and Properties of Neutron-Rich Nuclei, Proceedings of the Fifth International Conference: Sanibel Island, USA 4 -10 November 2012, Editors: J H Hamilton, A V Ramayya, World Scientific, (2013), Pg. 498.
13. **Minimization of the Effect of Third Order Dispersion in Parabolic Pulse Generation by A Normal Dispersion Fiber Amplifier, Debasruti Chowdhury, Navonil Bose, Mousumi Basu and Dipankar Ghosh,** Proc. of Recent Developments in Electrical, Electronics & Engineering Physics (RDE3P-2013), Paper no: RDE3P-PHY-01, page no: 185-189, October 26-27, 2013.
14. **Synthesis and Characterization of  $\text{GeO}_2$  Nanorods, Proc. of Recent Developments in Electrical, Electronics & Engineering Physics (RDE3P-2013),** page no: 205-207, October 26-27, 2013.
15. **Efficient Parabolic Similariton Generation by Highly Nonlinear Silica Based Fiber, Debasruti Chowdhury, Mousumi Basu and Dipankar Ghosh,** Proc. of International Conference on Recent Trends in Science & Technology (ICRTST 2013), Paper No.: D.Chowdhury\_117, Page No. 129-135 December 27-29, 2013.
16. **Efficient Parabolic Similariton Generation by Highly Nonlinear Silica Based Dispersion Decreasing Fiber, Debasruti Chowdhury, Dipankar Ghosh and Mousumi Basu,** Proc. of National Conference on Emerging Technology and Applied Sciences-2014 (NCETAS 2014), ISSN (Online): 2319-8753, Paper No.: ID\_16, Page No. 81-87, February 15-16, 2014.

17. **Synthesis and characterization of GeO<sub>2</sub> nanorods**, Sampad Mukherjee, National conference on RECENT DEVELOPMENTS IN ELECTRICAL, ELECTRONICS & ENGINEERING PHYSICS (RDE3P-2013),Page-205-207(2013).
18. **Preparation and Characterization of GeO<sub>2</sub> doped PVDF films**, Sampad Mukherjee, National conference on RECENT DEVELOPMENTS IN ELECTRICAL, ELECTRONICS & ENGINEERING PHYSICS (RDE3P-2013),Page-190-193 (2013).
19. **pH dependent study of structural and optical properties of Fe<sub>2</sub>O<sub>3</sub>**, Sampad Mukherjee, CONDENSED MATTER DAYS 2014 (CMDAYS14) at Department of Physics and Center for Research in Nanoscience and Nanotechnology, University of Calcutta
20. **“Improved Photoluminescence Property of CTAB Assisted Polyaniline-AlZnO nanocomposite”** Mousumi Mitra, Kajari Kargupta, Saibal Ganguly, **Dipali Banerjee**, DAE-SSPS 2014, 16<sup>th</sup>-20<sup>th</sup> December, 2014 (accepted for poster presentation).
21. **“Low-dimensional novel nanocomposite of polyaniline-graphene and its sensing application.”** Mousumi Mitra, Krishanu Chatterjee, Kajari Kargupta, Saibal Ganguly and **Dipali Banerjee**. International Conference on Advancements in Polymeric Materials CIPET-Bhubaneswar, 14-16<sup>th</sup> February, 2014.
22. **“Hydrogen storage material: Synthesis and characterization of graphene/PANI nanocomposite**, Shubhanwita Saha, Ananta Kr Sarkar, Mousumi Mitra, **Dipali Banerjee**, Saibal Ganguly and Kajari Kargupta International Conference on Advancements in Polymeric Materials CIPET-Bhubaneswar, 14-16<sup>th</sup> February, 2014.
23. **“Synthesis and characterization of reduced graphene oxide via organic and inorganic reducing agents – a comparison”** **Dipali Banerjee**, Mousumi Mitra, Krishanu Chatterjee, Kajari Kargupta, Saibal Ganguly, International Conference on Diamond and Carbon Materials Riva del Garda, Italy 2-5<sup>th</sup> September, 2013. (accepted for poster presentation)
24. **“Metal-free synthesis of graphene using formic acid and its conductivity studies”** Mousumi Mitra, Krishanu Chatterjee, **Dipali Banerjee**, UGC sponsored National Seminar On Advancement in Modern Physics, Ramkrishna Mission Narendrapur, 23-24<sup>th</sup> August, 2013.
25. **“Synthesis of nanostructured bismuth and its characterization”** Chiranjit Kulsi, Mousumi Mitra, **Dipali Banerjee**, UGC sponsored National Seminar On Advancement in Modern Physics, Ramkrishna Mission Narendrapur, 23-24<sup>th</sup> August, 2013.
26. **“Synthesis and Characterization of Nanostructured Bismuth Telluride, Polyaniline and their Composite for Device Application”** Krishanu Chatterjee, Saibal Ganguly, Kajari Kargupta and **Dipali Banerjee**, MRSI-YSC 2013.
27. **“Ammonia sensing performance of Polyaniline-graphene nanocomposite”** M. Mitra, K. Chatterjee, **D. Banerjee**, K. Kargupta, S. Ganguly, Third National Seminar on Condensed Matter Physics including Laser Application, Burdwan University, 5-7<sup>th</sup> march, 2013.
28. **“Enhanced electrical conductivity of novel cable-like polyaniline-bismuth telluride nanocomposite”**, K. Chatterjee, M. Mitra, M. Rahman, **D. Banerjee**, K. Kargupta, S. Ganguly, Third National Seminar on Condensed Matter Physics including Laser Application, Burdwan University, 5-7<sup>th</sup> march, 2013 (awarded best poster presentation).
29. **Irreversible Quenching of Photoluminescence from Silicon Quantum Dots in Low Magnetic Field**, Ujjwal Ghanta\*, Mallar Ray\*, Nil Ratan Bandyopadhyay\* & **Syed Minhaz Hossain**, accepted, 12<sup>th</sup> International Conference on Fiber Optics and Photonics-2014, Presentation ID: S5A.46

30. **“Photoluminescence Mechanism in Silicon Quantum Rods Studied by Time-Resolved Spectroscopy”**, U. Ghanta, M. Ray, **S. M. Hossain**; AIP Conf. Proc. 1536, 277 (2013).
31. **“Effect of uv Laser Radiation on the Photoluminescence Properties of Silicon Quantum Dot Colloids”**, U. Ghanta, M. Ray, N. R. Bandyopadhyay, **S. M. Hossain**; National Conference on Nanomaterials & Devices (NCONAD-2013), October 3-5, 2013, NIT Srinagar, Page No. 61.

**Book/Monograph written:**

**Title: “Hydrogenated carbon nitride by CH<sub>4</sub>/N<sub>2</sub> DBD plasma and its application”**

Publishing house: LAP LAMBERT Academic Publishing

ISBN-13:978-3-659-18875-6, ISBN-10:3659188751, EAN: 9783659188756

Website: <https://www.lap-publishing.com/>

By (author) : Abhijit Majumdar

**Seminar / Workshops / Conferences / Training programme organized by the department (2013 - 14)**

1. Seminar of Journal club on March 25, 2013, on “Shedding light on the Universe’s first sources of light through radio observations of neutral Hydrogen” by Dr. Kanan Kr. Datta.
2. Seminar of Journal club on 26th of April, 2013 on “Designing magnetoelectric multiferroics with ABO<sub>3</sub> Perovskite oxides as building blocks” by Dr. Saurabh Ghosh
3. Seminar of Journal club on 26th of April, 2013 on” Organic photovoltaic devices based on some dyes: Investigations-prospects-challenges” by Dr. Subhasis Maity
4. Seminar of Journal club on 18th of November, 2013 on “Advanced materials technology for transportation, aviation and space” by Dr. Shantanu Bhowmick
5. Seminar of Journal club on 7th of January, 2014 on “Newton’s Cradle, the Fermi, Pasta, Ulam problem and the Nonlinear Many Body Physics Frontier” by Prof. Surajit Sen
6. Seminar of Journal club on 2nd of April, 2014 on “Discovery Of A New Boson: The Quest Continues” by Prof. Manas Maity
7. Seminar of Journal club on 24th of July, 2014 on "Non equilibrium statistical mechanics and nonlinear dynamics of many body systems" by Prof. Surajit Sen
8. Seminar of Journal club on 29th of August, 2014 on “Focusing on research in cross-disciplinary areas for clean water, green energy and affordable healthcare: A spectroscopic survey” by Prof. Samir Kumar Pal



## Technology Developed / Innovations

### Advancements under TEQIP – Phase II

#### Foreign visits and Invited Lectures

1. **Nano structured Conducting Polymers: Thermoelectric Application, Dipali Banerjee.** International Conference on Advancements in Polymeric Materials CIPET-Bhubaneswar 14-16<sup>th</sup> February, 2014.
2. **Thermoelectric Materials: New Directions to an Old Problem, Dipali Banerjee** State Level Seminar on Current Trend in Material Science. U G C Sponsored & Organised by Uluberia College Howrah Dec 17, 2013
3. **Chaos in a Crazy Toy, Syed Minhaz Hossain, C.K.M. Memorial Workshop,** Organized by IAPT (RC-15) 21/06/2014, SNBCBS, Salt Lake, Kolkata.
4. **Use of Digital/Video camera in Physics Experiments, Syed Minhaz Hossain,** WORKSHOP ON Experimental Physics At Center for scientific Culture in collaboration with Department of Physics, Midnapore College Sponsored by DST, Govt. Of West Bengal January 18, 2014
5. **Use of digital camera in optics and spectroscopy, Syed Minhaz Hossain,** Two Days Workshop on Experimental Physics, Organized by, Chhattisgarh Swami Vivekananda Technical University At Rungta Group of Colleges. January 13, 2014.
6. **Studies on Dynamical Systems by Video Tracking, Syed Minhaz Hossain,** Two Days Workshop on EXPERIMENTAL PHYSICS Organized by Chhattisgarh Swami Vivekananda Technical University At Rungta Group of Colleges, Bhilai, January 14, 2014
7. **Teaching Physics at UB, Syed Minhaz Hossain,** IAPT convention-2013, St. Paul's College, 26/10/2013.
8. **Swing to Surface States: Physics and Applications, Syed Minhaz Hossain,** CKM memorial Workshop, Organized by IAPT (RC-15), SNBCBS, Salt Lake, Kolkata. August 2013.
9. **Use of Digital Camera in UG/PG physics projects, Syed Minhaz Hossain,** P. K. College, Contai, November 21, 2014.
10. **Use of webcam in undergraduate physics projects related to optics, optoelectronics and spectroscopy, Syed Minhaz Hossain,** Science Academies' Refresher Course on Designing Experimental Projects in Physics, Midnapore College 12 October, 2014
11. Invited talk on "*Weak interaction rates for astrophysical scenarios*", National Conference on Nuclear Dynamics and Nuclear Astrophysics, Calcutta University February 2013 by **Sukhendusekhar Sarkar**
12. Two Invited talk on Gamma spectroscopy at TIFR (March 2014) by **Sukhendusekhar Sarkar**
13. Invited talk on Historical Development of Quantum Theory at Physics Department NEHU, Shillong (May 2014) by **Sukhendusekhar Sarkar**
14. Invited talk at Leady Keane College on the occasion of Hundred years of Bohr's Theory :Medical Applications of Nuclear Physics (August 2014) by **Sukhendusekhar Sarkar**
15. Invited talk at MCKV Institute of Engineering, Howrah by **Sukhendusekhar Sarkar**
16. Dibyaduity Pramanik (Research Fellow), Foreign visit: Participation and presentation of research work in the EUROSHOOL on EXOTIC BEAM (7-13 September, 2014)

**Visitors to your Department ( Indian & Foreign):**

**Alumni Contribution to your Department**

**Training and Placement**

**Extension Activities and Societal outreach**

**New Academic / Research Initiatives**

**a) Academic Collaboration**

- 1. UGC DAE CSR, Indore, M.P. India**
- 2. Institute for Plasma Research, Gandhinagar, Gujarat, India**
- 3. Jadavpur University, West Bengal**
- 4. Saha Institute for Nuclear Physics, West Bengal**
- 5. University of Greifswald, Germany**
- 6. IIT, Kharagpur**
- 7. UGC-DAE CSR Kolkata Centre**
- 8. Calcutta University**
- 9. University of Buffalo, the State University of New York**
- 10. University of Trento, Italy**
- 11. UNSW, Australia**
- 12. Ravenshaw University, Cuttak, Odisha, India**
- 13. MCKV Institute of engineering, Liluah**

**b) Industrial Collaboration**

**Student's activity:**

1. Shubhajit Mondal and Kaushik Chatterjee, awarded 2<sup>nd</sup> prize in University level in the West Bengal State Youth Science Fare 2014.



***Department of Human Resource  
Management***



### About the Department:

The erstwhile Training and Placement of the Institute was rechristened as Department of Human Resource Department in the year 1994 -95 and is headed by one Professor and supported by one Assistant Training Officer and other staff.

The Department has its current activities in the following areas:

- Facilitation services for Job Placements of students of the university through Campus and Off-campus selection processes.
- Facilitating Vocational / Summer Training of the students of the Institute
- Grooming up ( Personality/Soft-Skill/ Performance Effectiveness ) Programme for the Students
- Facilitation for other career options : Preparatory programme for Competitive Exams and other Educational options abroad
- Industry-Contact programmes / Academic collaborations
- Entrepreneurship Development Programme
- IPR Awareness and Facilitating protection of IPR
- Career Counseling
- Industry Liaisoning

### Academic Programmes:

This predominantly is a service department catering to all UG, PG and Ph.D students; It also offers Ph.D Programme under Faculty of Social and Management Sciences. Currently there are five ( 5 ) registered Ph.D. Scholars in this department working in the arena of Entrepreneurship and IPR. Proposals have also been submitted to concerned authority of the Institute to offer Elective courses on Entrepreneurship and / or IPR for the engineering students.

**Faculty position:** 1 (One) Sanctioned faculty post: 1 (One) Vacant Post : Nil

### Faculty Profile

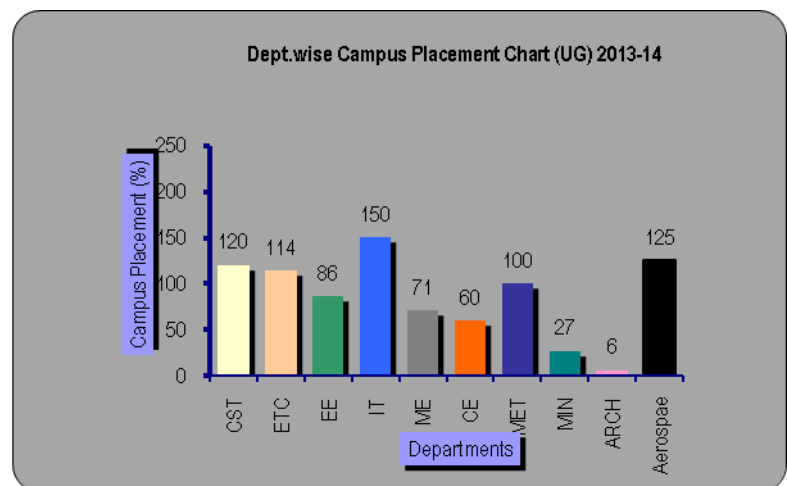
| Name         | Designation | Highest Qualification | Specialisation / Research Area  | Contact No.<br>E-mail           |
|--------------|-------------|-----------------------|---|---------------------------------|
| M. K. Sanyal | Professor   | Ph.D                  | <ul style="list-style-type: none"><li>• Entrepreneurship</li><li>• IPR</li><li>• Environmental Planning</li></ul> | 9831352950<br>hodhrm@becs.ac.in |

**Support staff position :** Sanctioned technical post : Nil

### Vital Information:

- Number of Company Visited for Campus Selection Process for UG Students : 61 + 3 ( Off-Campus )
- Total Number of Offers made to UG Students through Campus Selection process : 375 ( Including Dream Slot Offer 76)
- Number of Company Visited for Campus Selection Process for PG Students : 14
- Total Number of Offers made to PG Students through Campus Selection process : 53
- Range of Pay Packages Offered : **Rs. 8.5 Lakh – Rs. 2.5 Lakh** ( Annual CTC )

- **Department-wise Placement (UG) in %**



**Vacational Training :** During the year around 276 seats were organized in 37 organizations for summer placements of the students of pre-final year from 7 engineering disciplines.

### Grooming Activities organized by HRM Department

1. Special Counseling and Remedial Training Programme conducted for final year students under TEQIP-II fund.
2. Interactive Session on Potential of Research as a Career Option held on 20.09.2013
3. Launching of ICICI Trinity Innovation Programme on 16.04.2013
4. Interactive Session on Career Opportunities in Deptt. of Atomic Energy held on 11.01.2014



5. India Innovation Initiative organized jointly by CII and HRM Department, BESUS on 27.09.2013

6. Industry Meet organized by Society of Civil Engineers ( SOCCE )



### **Industry promoted students' activities facilitated by HRM Department**

1. TCS Best Student Award : Avik Dey, Metallurgy & Materials Engineering
2. Cognizant Foundation Scholarships
3. CIO Challenge conducted by Cognizant Technology Solutions
4. CCSP - conducted by Cognizant Technology Solutions
5. Unmesh – Internship programme of CESC
6. FDP on “Quality Engineering & Maintenance (Testing) ” on 28th of June 2013 organised by CTS
7. TCS Workshop on Research Work in TCS Innovation Lab on 24.07.2013
8. Final Idea Presentation Round of ICICI Trinit Innovation Programme at Mumbai on 20.12.2013 represented by BESU students' team.
9. Students Workshop on Smart Grid and Scope of Engineers in IT Industry organized by Tata Consultancy Services on 12.02.2014



### **Projects / Consultancy under HRM Department**

1. Tracers' Study for Career Prospecting of IESTS Students
2. Setting up of Tagore Centre for Green Technology Business Incubation (TCGTBI) Commencement of activities during the year.
3. Consultancy Projects on Conducting Environmental Impact Assessment ( EIA ) and Social Impact Assessment ( SIA ) of major development projects on behalf of RITES ( – A Govt. of India Undertaking ).

### **Participation of HRM Faculty Member in Academic and Corporate Activities**

1. Offered Course on IPR for M.Sc. Students at Kolkata University as Guest Faculty.



2. Member CII Eastern Region Innovation Task Force for the year 2013 -14
3. Classes taken on Entrepreneurship and IPR as a Guest Faculty for MSc course at SOCSAT during April – May 2013.
4. Member Patent Agent Examination Board; Examination organised by Indian Patent Office held on 5th. May 2013
5. Resource Person in the Panel Discussion on IPR and its application in R & D organized on the occasion of IPR Congress on 24<sup>th</sup>. September, 2013 organised by Patent Information Cell – West Bengal State Council of Science & Technology.
6. Attended Stake-Holders Meeting at Indian Patent Office October 2013 as a representative of the University
7. Attended International Conference at IIT – Roorkee on International Conclave on IPR And Innovation during 9-10 November, 2013 authored jointly with a UG Engineering student.
8. Attended International Conference at IIT – Roorkee on International Conclave on IPR And Innovation during 9-10 November, 2013 authored jointly with a UG Engineering student.
9. Keynote Speaker at IPR Workshop at NIT- Imphal held on 02 March 2014
10. Key Resource Person at IPR Workshop organized by NIELIT Ministry of Communication and Information Technology, Govt. of India
  - Kolkata on 14 December, 2014
  - Imphal on 29 January 2014
  - Kohima 03 .03.2014
11. Key-note speaker at three day Entrepreneurship Awareness Camp ( EAC ) sponsored by DST(WB) held during 20 – 22 March 2014 at Om Dayal College of Engineering & Architecture
12. AICTE Regional Workshop on Industry Academia Collaboration 20 – 21 June 2013. Documentation Sub Committee
13. Attended Accenture Placement Heads Meet “In Tune” at Goa on 29th June 2013
14. Served as Adviser to by Public Service Commission, West Bengal for their selection process scheduled on 8th. October, 2013.
15. Expert Member for Selection of Principal and other Faculty Members for RCCIT
16. Key Resource Person for Induction Programme at Narula Institute of Technology.
17. Resource Person for the Induction programme for Management Trainees organized by CESC Ltd.



# *Department of Students Activities*



## **A Brief History:**

On recommendation of the first Review Committee (1953), this department was started as the Proctorial Department in 1956 with the objectives of improving the personal qualities of students and look after their discipline, welfare and extra-curricular activities. The department was later renamed as the department of Students Activities with the redesignation of the proctor in 1985 to Professor-in-charge of Students Activities. The department functions under the direct supervision of the Professor-In-charge of Students' Activities.

### **Objectives:**

Broadly the department looks after the following specific works:

1. Supervise all matters relating to students welfare, discipline and extra-curricular activities including sports and games.
2. Exercise general supervision of all hostels and ensure proper running of the messes and observation of rules by the boarders.
3. Allotment of students to different Halls and Hostels in the respective academic sessions.
4. Exercise general supervision of the Athletic Club and activities of various sections of games and sports.
5. Any other duties as may be assigned by the Vice-Chancellor.

### **Halls & Messes:**

At present the total student strength of this institute is about 3000. There are 17 Halls/Hostels including two for UG and PG girls' students and one exclusively for Research Scholars girls. Each Halls /Hostels is under the direct supervision of a Superintendent selected from members of the faculty. Hostels Messes are supervised by the respective mess committee. A joint mess committee is a common forum for smooth running of the mess where the Professor-in-charge of Students' Activities acts as the Vice-Chancellor's nominee. This is also Executive Committee constituted to expedite the work to the service condition of the mess employees and other Hostel/Mess related works.

**Sports Board:-** The University also has a Sports Board and has got the facilities for almost all the Outdoor and Indoor games. The Institution has spacious playground like "Oval" & "Lords" and also there are Tennis, Volleyball, Badminton Court (Concrete), Basketball hard court and a well equipped gymnasium. The University also possesses an International Standard Swimming Pool for usage of all the communities attached with university system. The University recently developed a recreational centre (R.N.Mukherjee Students Amenity Centre) for the students and also a Yogic practice arena for the students, financially supported by two illustrious alumnus of this institution.

### **Academic Programme:**

**Additional Elective PT/NCC/NSS in Undergraduate level. Total yearly intake in BE/Integrated M.Tech programme.**

## **Faculty Profile:**

| Name                     | Designation                  | Highest Qualification | Specialization/Research Area                       | Contact No. e-mail |
|--------------------------|------------------------------|-----------------------|--|--------------------|
| Dr. Aditya Bandyopadhyay | Professor & PICSA            | Ph.D                  | Architecture & Regional Planning                   |                    |
| Dr. Zia-Ul-Alam          | P.I (Senior Scale)           | Ph.D                  | Social aspects of Physical Education and Sports    |                    |
| Sandip Chattopadhyay     | P.I (Senior Scale) ANO (NCC) | M.P.Ed NET            | Exercise and Sports Physiology, & Training Methods |                    |

## **Details of publications of each faculty members:**

Attended number of International and National Seminar/Symposium and presented valuable research papers for the development of future research programmes in the field of physical and sports sciences.

## **Alumni Contribution to the Department:**

In recent past, the **GAABESU** contributed a lot in developing the sporting facilities in the department. They initiated to take steps for renovation of the University Swimming Pool as well as the University Gymnasium with latest equipments and apparatus.

## **Sports Training:**

The physical instructors are really interested to develop a sporting culture among the students for their future endeavour. The scientific training procedure for development of sports performances of the students in different sporting events are being initiated for last 10 years or so. The natural talents of the students are being nurtured by the expertise sports science instructors. The instructors are also given opportunities to grab the latest knowledge in sports and exercise sciences for the development of the students.

**Extension Activities and Societal outreach:**

The University also initiated the extension programme like NSS among the students to develop their social character by helping the poorest of the poor citizens of the nation. By extending their hands to educate the people of the slum areas of their society in the form of various awareness programmes (like Use of clean water, Aids Awareness.)

Recently, the NSS unit organized a garment distribution programme and also organized a Voluntary Blood Donation camp in the University campus.

***Games and Sports Activities for the session 2013-14.*****A. INTRA INSTITUTIONAL COMPETITIONS:**

|    | <u>Nature of Activity</u>   | <u>Organizer</u> | <u>Date</u>   |
|----|---|------------------|---|
| 1. | Inter Department Football (M) Knock-out Tournament for 1 <sup>st</sup> Semester Boys. | BESUS            | 29.08.2013-03.09.2014.                              |
| 2. | Inter Year Cricket(M) Tournament  | BESUS            | 25.01.2014-26.01.2014                               |
| 3. | Inter Hostel TT (M) Tournament  | BESUS            | 28.01.2014-31.01.2014                               |
| 4. | Inter Year Football (M) Tournament  | BESUS            | 11.03.2014-14.03.2014                               |
| 5. | Inter Department Football (M) Tournament  | IESTS            | 19.03.2014-24.03.2014.                              |
| 6. | Inter Hostel Volleyball (M) Tournament  | IESTS            | 13.03.2014-23.03.2014                               |
| 7, | Inter Year Badminton (M/W) Tournament   | IESTS            | 07.04.2014-11.04.2014<br>&<br>10.04.2014-11.04.2014 |
| 8. | Inter Hostel Football (M) Tournament  | IESTS            | 25.03.2014-16.04.2014                               |
| 9. | Annual Athletic Meet  | BESUS            | 14 <sup>th</sup> February 2014.                     |

**B. INVITATION TOURNAMENTS ON VARIOUS SPORTING EVENTS ORGANIZED BY  
BESUS/IIESTS**

| <u>Nature of Activity</u>            | <u>Organizer</u> | <u>Date</u>           |
|--------------------------------------|------------------|-----------------------|
| 1. Invitation Football(M) Tournament | IIESTS           | 01.04.2014-11.04.2104 |

**EXTRA INSTITUTIONAL COMPETITIONS:**

**A. East Zone Inter University participation status in different sporting events;**

1. East Zone Inter University Football (M) Tournament: 2013-14.

Organized by: West Bengal State University, Barasat, 24 Pgs (N), WB.

Date: 03.10.2013- 07.10.2013

2. East Zone Inter University TT (M) Tournament: 2013-14

Organized by: Calcutta University.

Date: 10.02.2014 – 12.02.2014

**B. East Zone Inter College/Inter Technical Institute Competitions:**

1. **Sports Fest: PARAKRAM: 2014**

ISM, Dhanbad

Date: 05.02.2014-08.02.2014

2. **Chetan Devraj Memorial East Zone Inter Technical Institute/College Cricket Tournament:**

Organized by : BIT, Mesra, Ranchi.

Date: 23.01. 2014- 26.01.2014

*School of  
Community Science and Technology*





## About the School

Bengal Engineering & Science University, Shibpur has a fairly long tradition of rendering community service in a modest manner besides conducting academic programme. Community service rendered by the faculty members consists of formulation and implementation of specific programme of technology innovation and technology transfer to the Rural Sector. In response to the demand for proper co-ordination and integration of such activities of the faculty at University level, School of Community Science & Technology (SOCSAT) was created in 2004 at University for facilitating the development and growth of the unorganized sector in our country.

The objective of the school is to foster sustainable development of different marginalized communities by empowering stakeholders with inputs from institutionalized Science & Technology Community.

The school since then made significant progress in the frontier areas of basic and applied research in juxtaposition with various training programmes that are congruous with the objectives of the school. In this respect various science awareness programmes, several training programme on Advanced Pottery, Metal Art, Batik, Jute diversification including Advance Food Processing & Preservation Technology were organized by this school. The objectives of these programmes are to impart training to the marginalized people especially women Self-Help Groups of Howrah district in order to promote technology and create entrepreneurship. The training on food processing will improve the technical skills and knowledge in the processing of fruits and vegetables to the women of the rural areas and to take up income generating activities. As a result, two SHGs named Suktara and Prayas comprising those women were formed in Howrah District with the initiative of this School.

In this backdrop, the Academic Council of the University approved a four semester M.Sc. Course on **“Food Processing& Nutrition Science”** which had been started from the **Academic session (2007-2008)**. Around 100 students obtained MSc degree from this University under this course and placed in the Food Processing industries, R&D organization in food sectors, Academic institutes involved in R&D activities including PhD programmes and the Food analysis laboratories.

Besides above **Government of India’s Corporate Social Responsibility(CSR) scheme**, The Garden Reach Shipbuilders & Engineers Limited (GRSE),Kolkata, a Govt. of India undertaking under the Ministry of Defence, entrusted SOCSAT with a CSR project to impart **“Skill development/Vocational Training to the unemployed youth around the locality in Metiabruz, Kolkata”** where the GRSE plant is situated. The objective of the

proposed programme is to appropriately train the unemployed youth for their employment in appropriate trade and /or to enable them to start entrepreneurship.

### **Academic Programmes**

**a. Undergraduate Level:** N.A

**b. Postgraduate Level**

i) Degree Offered: **Master of Science in Food Processing and Nutrition Science.**

ii) Sanctioned Students' intake: **27 nos. students per year**

iii) Additional intake through other programmes **N.A**

iv) Specialization in **(a) Microbial Enzyme Technology (b) Nutritional Biochemistry**

### **Doctoral & Post Doctoral Research Programme**

i) Degree Offered: **Ph.D Science**

No of candidates enrolled: **17** Registered: **15** Awarded: **0** Submitted: **0**

**Post Doctoral Research Programme:** Dr. Avery Sengupta, Post Doctoral fellow of UGC-Dr. D.S. Kothari PDF, under Prof. D. K. Bhattacharyya.

### **Faculty position:**

**Sanction faculty post N.A Vacant post N.A**

(a) Faculty profile (In the following table)

| Name                   | Designation                       | Highest Qualification | Specialization /Research Area               | Contact no E-mail                      |
|------------------------|-----------------------------------|-----------------------|---|--|
| Prof.S.K.Mukherjea     | Professor & Director              | PhD                   | Computational Fluid Dynamics                | 9831209985<br>mksujay@gmail.com        |
| Prof.D.K.Bhattacharyya | Adjunct Professor                 | PhD (Science)         | Oil Technology                              | 9231586943<br>Dkb_olitech@yahoo.co.in  |
| Dr. Mnakshi Ghosh      | Assistant Professor (Contractual) | PhD (Science)         | Analytical Chemistry/ Extraction Technology | 9831118228<br>g_minakshi2000@yahoo.com |
| Dr. Jayati Bhowal      | Assistant Professor (Contractual) | PhD (Science)         | Biochemistry and Microbiology               | 9831672455<br>bjayati@yahoo.com        |

### **Awards and Laurels:**


- “A Novel Approach to Develop Antioxidant Enriched Rice Bran Oil “by Sanjukta Kar\*, Samadrita Sengupta, D. K. Bhattacharyya. (**Awarded 2nd prize in the poster presentation session in GNIT, 2013**)
- “Development of Green Technology for Making Nano Starch Crystals And their film Forming Properties” by Tanimu Bhattacharya, Nilratan Bandyopadhyay, Dipa Roy, Dipak Kumar Bhattacharyya, **Certified as Award of Excellence** in the poster presentation session in Engineering and Technology Category in 20th State Science and Technology congress 2013,
- “Technology of Production of Synbiotic Dahi ” by Samadrita Sengupta, Jayati Bhowal and D. K. Bhattacharyya. Certified as **Award of Excellence in the poster presentation session** in Life Science Category in 20th State Science and Technology congress 2013, in Indian Institute of Engineering Science and Technology, Shibpur, formerly BESUS.



### **Research area**

- Nanotechnology in food products
- Extrusion technology in food
- Development and evaluation of nutritionally enriched spread products
- Isolation and utilization of non oil constituent of oil bearing materials
- Technology developments for Non- Dairy products of superior Nutritional Quality at significantly reduced cost.
- Technology development particularly microbial fermentation process for making value- added products from waste fruits and vegetables for food applications.
- Microbial oils for functional Food and Nutraceuticals from Micro organisms screened and isolated from soils mainly.
- Colour from soil microbes for food uses and microbial enzymes such as Lactase, Lipases etc. for food industries.
- Shelf life both oxidative and microbial of non- dairy food products and food products in general.
- Production and application of bioactive peptides from natural and microbial sources for food use.
- Development of biotechnological processes for the production of bioflavour.




## Research facilities:

| Name of Equipment   | Few words  | Pictures   |
|---------------------|--|--|
| Twin Screw Extruder | <p>Twin screw extrusion is used extensively for mixing, compounding, or reacting polymeric materials. The flexibility of twin screw extrusion equipment allows this operation to be designed specifically for the formulation being processed. The configurations of the screws themselves may be varied using forward conveying elements, reverse conveying elements, kneading blocks, and other designs in order to achieve particular mixing characteristics.</p> |   |
| Centrifuge          | <p>In Centrifuges the centrifugal force is mechanically generated by turning the equipment containing the fluid in a circular path causing the fluids to separate. This method has been used in the laboratories and primitive industries for over a century. It has mainly been used to separate fluids in static state, i.e. ,specific volumes which needed to be separated.</p>   |  |



|                   |   |   |
|-------------------|---|---|
|                   |   |   |
| Vacuum Tray Drier | <p>Under the condition of vacuum, the boiling point of raw material will decrease and make the pushing force become greater. Therefore for a certain amount of heat radiation, the conducting area of evaporator can be saved. The heat source for operation of evaporation may be low pressure steam or surplus heat steam. The heat loss of evaporator is less. During the period of drying, there is no impurity material mixing. It belongs to static drier. So the shape of raw material to be dried can not be destroyed.</p> |  |
| Hot Air Oven      | <p>This electrical devices used in sterilization. The oven uses dry heat to sterilize articles. Generally, they can be operated from 50 to 300 °C (122 to 572 °F). There is a thermostat controlling the temperature. These are digitally controlled to maintain the temperature.</p>   |   |

|                         |   |   |
|-------------------------|---|---|
|                         |   |    |
| <p>Laminer<br/>Flow</p> | <p>Horizontal Laminar Airflow Table Top Workstation provides a HEPA filtered clean work area that is ideal for operations requiring a particle-free, bacteria-free, clean air environment. The clean work area provides an excellent work space for small laboratory appliances, microscopes, pipetting, or similar applications.</p> |  |








|                           |  |  |
|---------------------------|--|--|
| <p>BOD Incubator</p>      | <p>This electrical device helps to maintain temperature. Digitally controlled temperature regulator is present to preset the temperature as per the required incubation temperature.</p> |     |
| <p>Microwave</p>          |  |   |
| <p>Reynolds apparatus</p> | <p>To determine the Reynold's number and hence the type of flow either Laminar or turbulent and also to determine upper &amp; lower critical Reynold's number's &amp; velocities.</p>    |  |





|  |   |  |
|--|---|--|
| <p>Sieves Shaker with Brass Sieves</p> | <p>Used to agitate sieves for determining gradation in soils and finest modules in aggregates. Unique orbital motion ensures precise gradation. Quick release adjustable clamps secure sieves firmly in position. Hold feature on the 15-minute timer permits continuous agitation. Holds up to eight sieves plus a dust pan and accepts either eight or twelve inch sieves.</p>  |    |
| <p>Colorimeter</p>                     | <p>A device used in colorimetry. In scientific fields the word generally refers to the device that measures the absorbance of particular wavelengths of light by a specific solution. This device is most commonly used to determine the concentration of a known solute in a given solution by the application of the Beer-Lambert law, which states that the concentration of a solute is proportional to the absorbance.</p> |  |

|              |  |  |
|--------------|--|--|
| Microscope   | <p>An instrument used to see objects too small for the naked eye. The science of investigating small objects using such an instrument is called microscopy. Microscopic means invisible to the eye unless aided by a microscope.</p> |     |
| Penetrometer | <p>An instrument used to determine the penetration value of food products. Penetration value helps to determine the hardness and texture of the product.</p>   |   |
| Homogeniser  | <p>A device which helps to homogenize two immiscible phases by applying rotating force at high RPM.</p>  |  |

|                  |  |  |
|------------------|--|--|
| Centrifuge       | <p>In Centrifuges the centrifugal force is mechanically generated by turning the equipment containing the fluid in a circular path causing the fluids to separate. This method has been used in the laboratories and primitive industries for over a century. It has mainly been used to separate fluids in static state, i.e., specific volumes which needed to be separated.</p> |    |
| Micro-centrifuge | <p>In Centrifuges the centrifugal force is mechanically generated by turning the equipment containing the fluid in a circular path causing the fluids to separate.</p>   |   |
| Refrigerator     | <p>An electrical equipment which helps to keep the food samples and chemicals cool in lower temperature.</p>   |  |

|                          |   |  |
|--------------------------|---|--|
| Freezer                  | <p>This electrical device helps to maintain cold temperature. Digitally controlled temperature regulator is present to preset the temperature as per the required incubation temperature.</p> |    |
| Gas Liquid Chromatograph | <p>A sophisticated instrument which helps in fatty acid analysis, flavor analysis of different samples.</p>   |  |



|                   |  |  |
|-------------------|--|--|
| Lyaophiliser      | An instrument which helps in freeze drying process of samples. Liquid Nitrogen is used to carry out the process.   |   |
| Spectrophotometer | An instrument which gives spectrum measurement of various sample solution. This device is most commonly used to determine the concentration of a known solute in a given solution by the application of the Beer-Lambert law, which states that the concentration of a solute is proportional to the absorbance. |  |

**Name of laboratories:**

1. Food Processing Lab.
2. Food Preservation Lab.
3. Microbiology Lab.
4. Unit Operation Lab.
5. Chemical Analysis Lab.
6. Student Computer Lab.

**Consultancy work:****Support staff position:**

(i) Sanctioned technical post:

(ii) Technical staff profile

**Sponsored Research (during 2013-2014):**

| Sl. No. | Title of Research Project  | Sponsoring Agency   | Year of Start and duration |
|---------|--|---|----------------------------|
| 01.     | Development of technology to make low cost nutritionally effective 'ready to eat' protein rich human food from oil seeds or deoiled edible seed cakes (seed meals) by co-extrusion with cereals. | Ministry of Consumer Affairs, Food & Public Distribution, Government of India | January 2012, 3 years      |
| 02.     | <b>Value: 10.70 lakhs.</b>   | UGC   | 2013 2 years               |
| 03.     | Study on production of Single Cell Protein for food and feed application from waste fruits, UGC.   | MOFPI   | 2013                       |
|         | <b>Value: 2.00</b>   |   |                            |
|         | Creation of infrastructural facilities for running degree course in food processing technology” <b>Value:74.75 lakhs</b>   |   |                            |

**Industry-Institute Interaction**

**Corporate Social Responsibility (CSR) project** to impart “*Skill development/Vocational Training to the unemployed youth around the locality in Metiabruz, Kolkata*” by Garden Reach Shipbuilders & Engineers Limited (GRSE), Kolkata, a Govt. of India undertaking under the Ministry of Defense.

**Value: 32.00 lakhs**

## Details of publications of each faculty member (2013-2014)

**Dr. Minakshi Ghosh**

(Journal )

| Sl. No. | Title of Research paper  | Title of the Journal  | Year | Vol./ issue No | Page Nos. |
|---------|--|---|------|----------------|-----------|
| 01.     | Preparation of Some Nutritionally Superior Quality Mayonnaise Products   | International Journal of Applied Sciences & Engineering   | 2013 | Vol. 01 No. 01 | 15-20     |
| 02.     | Utilization of Moringa Leaves as Valuable Food Ingredient in Biscuit Preparation   | Int. Journal of Applied Science and Engineering   | 2013 | Vol. 01 No. 01 | 29-37     |
| 03      | Developments of some bioactive compounds based Soy Spreads   | Annals of Biological Research   | 2013 | vol.4, issue-7 | 212-221   |
| 04      | Study on utilization of Jackfruit seed flour and de-fatted soy flour mix in preparation of breakfast cereal by Twin-screw Extrusion Technology | International Journal 'Discovery'   | 2013 | Vol 4, No.11,  | 32-37     |
| 05      | Studies on preparation of protein rich pulse substitute and vegetable meat from oil seed flour by twin screw extrusion technology              | Asian Academic Research Journal of Multidisciplinary, AARJMD                                      | 2013 | Vol.1 Issue 14 |           |
| 06      | Chemo Informatics: the Healthy Results of Information Science and Chemical Science Integration   | International Journal of Computer Science Systems Engineering and Information Technology-IJCSSEIT | 2013 | Vol.6 No.2     | 92-96     |
| 07      | Food and Nutrition Information Systems in India: Challenges and Issues   | International Journal of Computer Science and Knowledge Engineering-IJCSKE                        | 2013 | Vol.7 No.2     | 134-138   |
| 08      | Information Science: The Multidisciplinary, Interdisciplinary field for Information cum Technological Solution for People and Wider Community  | International Journal of Information Science and Computing  | 2014 | Vol. 1 No. 1   | 25-29     |
| 09      | Information Systems & Networks (ISN): Emphasizing Agricultural Information   | Scholars Journal of Agriculture and Veterinary Sciences   | 2014 | Vol 1 No.1     | 38-41     |

|    |   |  |      |                 |  |
|----|---|--|------|-----------------|--|
|    | Networks with a case Study of AGRIS   |  |      |                 |  |
| 10 | Technology Development for Producing Bitter and Flavor Free Mustard Spreads | Journal of International Academic Research for Multidisciplinary | 2014 | Vol 2, Issue 6, |  |

### Conference

1. “Studies on utilization of glycerol in making DAG rich oils for exclusive use in value added spread products” by Sanjukta Kar, M. Ghosh and D. K. Bhattacharyya, 68<sup>th</sup> Annual Convention of Oil Technologists Association of India, International Conference on Emerging Trends in Oleochemicals and Lipids 2013, August 8-10, 2013, CSIR Indian Institute of Chemical Technology, Hyderabad.
2. “Process development for the preparation of mustard meal with reduced pungency and bitterness and its use in extended food product formulation” by Priyadarshini Chakroborty, M. Ghosh. N. R. Bandyopadhyaya and D. K. Bhattacharyya, 68<sup>th</sup> Annual Convention of Oil Technologists Association of India, International Conference on Emerging Trends in Oleochemicals and Lipids 2013, August 8-10, 2013, CSIR Indian Institute of Chemical Technology, Hyderabad.



### Details of publications of each faculty member (2013-2014) Dr. Jayati Bhowal

(Journal )

| Sl. No. | Title of Research paper   | Title of the Journal   | Year | Vol./ issue No | Page Nos. |
|---------|---|--|------|----------------|-----------|
| 01.     | Identification and Characterization of Extracellular Red Pigment Producing Bacteria Isolated from Soil. | <i>Int. J. Curr. Microbiol. App. Sci .</i>                               | 2014 | 3(9)           | 169-176   |
| 02.     | Production and evaluation of yogurt with watermelon ( <i>Citrullus lanatus</i> ) juice.                 | <i>Journal of International Academic Research for Multidisciplinary,</i> | 2014 | 2(5)           | 249-257   |
| 03      | Development of new kinds of soy yogurt containing functional lipids as superior quality food.           | <i>Annals of Biological Research</i>                                     | 2013 | 4(4)           | 144-151   |
| 04      | Studies on isolation and characterization of lactase produced from soil bacteria.                       | <i>Research Journal of Recent Sciences</i>                               | 2013 | 2(8)           | 1-8       |

### Conference

1. “Technology of Production of Synbiotic Dahi” by Samadrita Sengupta, Jayati Bhowal and D. K. Bhattacharyya .(**Certified as Award of Excellence in the poster presentation session in Life Science Category** in 20th State Science and Technology congress 2013, held at IEST, Shibpur formerly BESUS).
2. “Production of low-cost and nutritionally superior quality non-dairy cheese products from selective oil seed meals and oils” by Samadrita Sengupta, Jayati Bhowal and D. K. Bhattacharyya, 68<sup>th</sup> Annual Convention of Oil Technologists Association of India, International Conference on Emerging Trends in Oleochemicals and Lipids 2013, August 8-10, 2013, CSIR Indian Institute of Chemical Technology, Hyderabad.

**Details of publications of each faculty member (2013-2014)****Prof. D. K. Bhattacharya**

(Journal )

| <b>Sl. No.</b> | <b>Title of Research paper</b>   | <b>Title of the Journal</b>                                      | <b>Year</b> | <b>Vol./ issue No</b> | <b>Page Nos.</b> |
|----------------|--|--|-------------|-----------------------|------------------|
| 01.            | Preparation of Some Nutritionally Superior Quality Mayonnaise Products   | International Journal of Applied Sciences & Engineering          | 2013        | Vol. 01<br>No. 01     | 15-20            |
| 02.            | Utilization of Moringa Leaves as Valuable Food Ingredient in Biscuit Preparation   | Int. Journal of Applied Science and Engineering                  | 2013        | Vol. 01<br>No. 01     | 29-37            |
| 03             | Developments of some bioactive compounds based Soy Spreads   | Annals of Biological Research                                    | 2013        | vol.4,<br>issue-7     | 212-221          |
| 04             | Study on utilization of Jackfruit seed flour and de-fatted soy flour mix in preparation of breakfast cereal by Twin-screw Extrusion Technology | International Journal 'Discovery'                                | 2013        | Vol 4,<br>No.11,      | 32-37            |
| 05             | Studies on preparation of protein rich pulse substitute and vegetable meat from oil seed flour by twin screw extrusion technology              | Asian Academic Research Journal of Multidisciplinary, AARJMD     | 2013        | Vol.1<br>Issue 14     |                  |
| 06             | Technology Development for Producing Bitter and Flavor Free Mustard Spreads  | Journal of International Academic Research for Multidisciplinary | 2014        | Vol 2,<br>Issue 6,    |                  |
| 07             | Development of new kinds of soy yogurt containing functional lipids as superior quality food.  | Annals of Biological Research                                    | 2013        | 4(4)                  | 144-151          |
| 08             | Studies on isolation and characterization of lactase produced from soil bacteria.  | Research Journal of Recent Sciences                              | 2013        | 2(8)                  | 1-8              |

|    |   |  |      |                |     |
|----|---|--|------|----------------|-----|
|    |   |  |      |                |     |
| 09 | In vitro antioxidant assay of medium chain fatty acid rich rice bran oil in comparison to native rice bran oil                    | Journal of Food Science and Technology | 2014 | -              | 1-8 |
| 10 | Antioxidative Effect of Rice Bran Oil and Medium Chain Fatty Acid Rich Rice Bran Oil in Arsenite Induced Oxidative Stress in Rats | Journal of Oleo Science                | 2014 | <b>63 (11)</b> | 1-8 |

### Conference

1. "Technology of Production of Synbiotic Dahi" by Samadrita Sengupta, Jayati Bhowal and D. K. Bhattacharyya .(**Certified as Award of Excellence in the poster presentation session in Life Science Category** in 20th State Science and Technology congress 2013, held at IEST, Shibpur formerly BESUS).
2. "Production of low-cost and nutritionally superior quality non-dairy cheese products from selective oil seed meals and oils" by Samadrita Sengupta, Jayati Bhowal and D. K. Bhattacharyya, 68<sup>th</sup> Annual Convention of Oil Technologists Association of India, International Conference on Emerging Trends in Oleochemicals and Lipids 2013, August 8-10, 2013, CSIR Indian Institute of Chemical Technology, Hyderabad.
3. "Studies on utilization of glycerol in making DAG rich oils for exclusive use in value added spread products" by Sanjukta Kar, M. Ghosh and D. K. Bhattacharyya, 68<sup>th</sup> Annual Convention of Oil Technologists Association of India, International Conference on Emerging Trends in Oleochemicals and Lipids 2013, August 8-10, 2013, CSIR Indian Institute of Chemical Technology, Hyderabad.
4. "Process development for the preparation of mustard meal with reduced pungency and bitterness and its use in extended food product formulation" by Priyadarshini Chakroborty, M. Ghosh. N. R. Bandyopadhyaya and D. K. Bhattacharyya, 68<sup>th</sup> Annual Convention of Oil Technologists Association of India, International Conference on Emerging Trends in Oleochemicals and Lipids 2013, August 8-10, 2013, CSIR Indian Institute of Chemical Technology, Hyderabad.
5. "A Novel Approach to Develop Antioxidant Enriched Rice Bran Oil "by Sanjukta Kar, Samadrita Sengupta, D. K. Bhattacharyya. (**Awarded 2nd prize in the poster presentation session in GNIT, 2013**)
6. "Development of Green Technology for Making Nano Starch Crystals And their film Forming Properties" by Tanima Bhattacharya, Nilratan Bandyopadhyay, Dipa Roy, Dipak Kumar Bhattacharyya, **Certified as Award of Excellence** in the poster presentation session in Engineering and Technology Category in 20th State Science and Technology congress 2013, Books/Monograms

## **Seminar/Workshops/Conferences/Training programme organized by the Department (2013-2014)**

- Skill development/Vocational Training to the unemployed youth around the locality in Metiabruz, Kolkata” , Garden Reach Shipbuilders & Engineers Limited (GRSE),Kolkata, a Govt. of India undertaking under the Ministry of Defence from January 03, 2013.

## **Technology Developed/Innovations.**

- Technology of production of functional food products such as non dairy yogurts, soy and other peanut butter like spread products of superior quality.
- Twin Screw Extrusion Technology
- Microbial fermentation process for making value- added products from waste fruits and vegetables for food applications

## **Advancement under TEQIP- Phase II: N.A**

## **Foreign visits and Invited Lectures: N.A**

## **Visitors to your Department (Indian & Foreign): N.A**

## **Alumni Contribution to your Department: N.A**

## **Training and Placement**

Placement of the Trainees after completion of the “Skill development/Vocational Training to the unemployed youth around the locality in Metiabruz, Kolkata” , Garden Reach Shipbuilders & Engineers Limited (GRSE),Kolkata, a Govt. of India undertaking under the Ministry of Defense”.

**Food and Beverage Services( KFC,Dominos,Catering service,), Media Entertainment ( Television,Photography,Videography in various ceremony ),Automobile (Garage, personal work),Plumbing (Various new multiplex), Carpentry (Interior)**

## **U. Extension Activities and Social outreach**

Skill development/Vocational Training to the unemployed youth around the locality in Metiabruz, Kolkata” , Garden Reach Shipbuilders & Engineers Limited (GRSE),Kolkata, a Govt. of India undertaking under the Ministry of Defense.

## **V. New Academic /Research Initiatives**

### **a) Academic Collaboration: N.A**

### **b) Industrial Collaboration:**

**A Tripartite MOU with Garden reach Shipbuilders & Engineers Ltd. (GRSE) and Kolkata Police has been signed on 9<sup>th</sup> June 2014.**



Sharing MOU Document

Director, IEST delivering lecture on MOU sign



*School of  
Disaster Mitigation Engineering*



*The source of man's unhappiness is his ignorance of Nature.*

— Paul Henry Thiry d' Holbach

## INTRODUCTION

Even in this era of being netizens, despite tremendous effort and advancement in the spheres of science, engineering and technology, many a time people have succumbed to the vagaries of nature. Globally, natural disasters account for nearly 99% of all the disaster-affected people in the last decade.<sup>1</sup> The further disturbing fact is that even in a region like South Asia, where poverty, deprivation, and death due to disasters are a common enough feature of life, India remains the worst-affected country. In fact, between 1997 and 2006, disasters reportedly killed 83,252 people and affected another 704.21 million in India.<sup>2</sup> Experiences and study tell us that the actual figures greatly exceed the documented ones. This type of devastating forces of nature certainly points out the immediate need of expertise to combat the major natural disasters, viz. earthquake, flood, drought and cyclone; and, minor natural disasters, viz. heat wave, cold wave, landslide, avalanche, tornadoes and hailstorm. In this context, Bengal Engineering and Science University, Shibpur with the help of a group of distinguished faculty members pursuing their research in the area of Earthquake, Windstorm, Hydrology, Stability of Land slopes etc., wholeheartedly desires to extend the academic expertise to cater to the need of minimizing the devastating effect of such calamities.

The geographical location of our state is in a peculiar situation; the northern portion of it is surrounded by a number of active faults in the Himalayan Region, and the North Indian Ocean Cyclone Region is at its south. The entire North Bengal is surrounded by a number of active faults in the Himalayan region, and hence is included in the Zone IV of the Indian earthquake code.<sup>3</sup> Broadly speaking, the earthquake tremors of the active faults of this region results into landslides; again, the landslides on their turn compounded with deforestation causing soil erosion, results into flood in the lower districts of the state. Again the threat of super-cyclones has of late become an annual



**Fig.1: Map of West Bengal**

<sup>1</sup> World Disaster Report, 2007

<sup>2</sup> Ibid

<sup>3</sup> IS: 1893 (Part 1) – 2002



feature during the months of May or November. The different facets of natural disasters, which are threatening the nation as a whole and the state as a particular, need to be tackled in a holistic manner.

### **The Issue of Earthquake**

Earthquakes unleash energies on the scale of nuclear explosions. While they rarely announce their arrival in advance, even the strongest earthquakes are over in a matter of moments. Tectonic motion cannot be prevented, but the probability of the occurrence of earthquakes of different magnitudes can be estimated. Safety measures can then be undertaken in advance. Damage



**Fig. 2: Devastating Earthquake in Gujarat**

control is a life-saving and cost-effective alternative to reconstruction. This is more so important because, of all disasters, only earthquakes permanently reconfigure a landscape. However, for survival of structures in the event of earthquake following measures should be immediately taken ---

- i) Seismic microzonation of the area in question to assess the seismic vulnerability of various locations; and,
- ii) Formation of appropriate guidelines, rules and regulation for the survival of buildings and other utility structures during earthquakes.

### **The Issue of Landslide**



**Fig. 3: Front pictorial view of the Penegal landslide at Sikkim<sup>4</sup>**

A landslide is a sudden collapse of a large mass of hillside. There are many different types of landslides, where not only earth, but rock, mud, and debris flow down the side of a slope. All earth and material on a slope has an “angle of

repose,” or an angle at which that material will remain stable. Loose dry rock remains in place at angles up to 30 degrees, but wet clay will start to slip at more than 1 or 2 degree inclinations. Landslides are the

sudden downhill movements of earth or other solid material, and are usually caused by rain, thaws, or forces increasing the top material weight, lubricating the material layers, or making the slope too steep. They can be triggered by earthquakes, saturation with heavy rain, or crashing waves. History’s largest and most destructive landslides are due to earthquakes that started the material moving. Excessive rain or snowmelt, however, is also known to saturate and lubricate soil on steep angles. Rapid temperature changes can also cause land slide by alternately shrinking and expanding soil formations, or by forming ice heaves between layers of rock. Forest fires are indirectly responsible for landslides because they take away slope vegetation, making erosion easier. Man can also cause slides by mining the earth, underground excavation, pumping and draining groundwater levels, or overdeveloping hillsides.

Complete prevention of landslides and toe erosion is not a feasible proposition but the aim of prevention can be partly achieved by any one or more of the following means —

- i) Easing of slopes;
- ii) Bitumen asphalt mulching or grouting by use of asphaltic cement bitumen emulsion on outback bitumen;
- iii) Afforestation;
- iv) Provision of stilling pools or hydraulic jump immediately below the site of toe erosion;
- v) Removal of all obstacles like huge boulders in the way of the current;
- vi) Provision of chutes and sloping aprons.

Relevant data in respect of geology, hydrology and seismology of the areas enables engineers to determinate correct design parameters and to assess forces to be countered upon by the structure correctly.

---

<sup>4</sup> [www.rurkiu.ernet.in/.../slide7a.jpg](http://www.rurkiu.ernet.in/.../slide7a.jpg)

## **The Issue of Flood**

The term "flood" is a general or temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters or from the unusual and rapid accumulation or runoff of surface waters from any source.

Flooding and flash flooding are the deadliest of natural disasters.

Floodwaters claim thousands of lives every year and render millions homeless. One of the more frightening things about flooding is that it can occur nearly anywhere, at any time. It can result from excess

water jams on rivers, even moderate rain, or a single very heavy downpour.

### **Destruction of Natural Terrain: Growth of Unplanned Settlement**

It is observed that for the establishment of large scale settlements, often the natural slope is destroyed by cut and fill method, and, man-made new terrains are created. These man-made terrains have a cumulative effect on accumulation of rain water and disposal of the same to the nearest river bed. But going against nature ultimately proves fatal. The study team will demarcate areas which should only be used for the purpose of shelter-construction, and, shall propose methodologies to avoid the destruction of natural terrain.

## **OBJECTIVES**

With this petite introduction regarding different facets of natural disasters, the objectives of the School of Disaster Mitigation Engineering, which was set up in 2007 by the University, are stated below.

### **Technology Development**

- To study the structural and architectural details of the low-cost non-engineered structures at the coastal regions.



**Fig. 4: Crossing the flood – Effect of Teesta<sup>5</sup>**

---

<sup>5</sup> [www.azeecon-lwf.com](http://www.azeecon-lwf.com)

- To work out architectural plan and the design procedure of the anchorages for the roofs, bonds for walls etc. from the viewpoint of wind engineering through a computational study.
- To carry out the tests of model buildings in wind tunnels to check the adequacy of the suggested design procedures.
- To advocate seismically resistant economically viable design methodology of structures.
- To put forward improved design methodology of dams and embankments to ward off the dreadful effect of flood.
- Finally to arrive at the drawings and structural detailing of some typical domestic units that can be directly constructed.
- To construct one or two pilot structure at the site to study the performance of the same in real situation.

### **Technology Transfer**

Various developed methodologies are required to reach at the hand of practicing engineers. Hence, a number of Tailor-made Short Term Courses are to be conducted on regular basis by the research group at the School and the practicing engineers are the expected participants. Outcomes of the research work will also be published and attempted to be included in the Code.

### **ACHIEVEMENTS IN THE AREA**

- More than 50 research publications in Journals and Conferences of International and National repute.
- A number of research projects funded by *Board of Research in Nuclear Sciences, Council of Scientific and Industrial Research, University Grants Commission, Department of Science and Technology* and *All India Council of Technical Education*.
- Research involvement of four doctoral students in the field.
- Recognition of a faculty member as Young Scientist by Department of Science and Technology, Government of India, for his research in this field.
- Award of Sir Arthur Cotton Memorial Medal by institution of Engineers (India) for a publication in the field of Earthquake Engineering in Institution's Journal. This was judged as the best paper in Civil Engineering for the year.

### **ANNUAL REPORT (2007-10) : SCHOOL OF DISASTER MITIGATION ENGINEERING**

1. As per resolution in BOM, dated 24.11.05, the School was proposed to be established.

2. Dr. B. C. Chattopadhyay, Professor, Department of Civil Engineering, was appointed Director of School from 15-03-2007 vide RDO/ 2/ 767/ 4/ 0/ 6 dated 15-03-2007 from Registrar, BESUS.
3. An Working Committee to help the Director was framed on 21-03-2007 consisting of Dr. S. C. Dutta, Professor, Department of Civil Engineering; Dr. N. R. Bandopadhyay, Professor and Director, School of Material Science and Engineering; Dr. A. Ghosh, Assistant Professor, Department of Civil Engineering; Dr. P.K. Das, Assistant Professor, Department of Applied Mechanics and Drawing; Mr. R. Roy, Assistant Professor, Department of Applied Mechanics and Drawing; Mr. P. Mukhopadhyay, Assistant Professor, Department of Architecture, Town and Regional Planning; and, Mr. S. Kar, University Engineer. The Committee met from time to time to discuss and finalise needed actions.
4. The first priority before Director was to help TEQIP to procure a 1.5m x 1.5m Horizontal Shaking Unit with payload of approximately 7 tonne, capable of producing around 1.5g of PGA for testing the seismic performance of model structures. The proposal for procurement of such a facility with its detailed specification was prepared by Dr. S. C. Dutta. The whole equipment was finalised to be procured through AIMIL Ltd. for USA.
5. Housing was planned for the said Shaking Unit on the plot near Old Hospital Building of the University. Necessary planning, designing, tendering and construction were made through University Engineer with financial help by authority of the University. A 4.2m x 8m shed was finally constructed for housing.
6. All internal detailing of the Work Station will be done in near future.
7. The equipment was installed and demonstrated before the members of Working Committee on 28-05-2008. The details of the equipment installed are appended at the end of the report.
8. The School is allotted third floor of the second newly constructed Eight Storied Building vide order AT/ 38 – 19/ 2007/ 427 dated 27-11-2007.
9. Request was made to the Convenor LIPMU for procuring Vibration Shaker of low capacity for pursuing doctoral thesis of Mr. P. Mukhopadhyay on 02-07-2007.
10. Dr. S. C. Dutta, Professor of Civil Engineering was appointed new Director of the school vide AT/ BOM – 43/ 2008/ 461 dated 03-06-2008.
11. Dr. Ambarish Ghosh, Professor of Civil Engineering was appointed new Director of the school vide RMS-1/4018 dated 08.01.10
12. A Working group has been formed with the permission of the Vice Chancellor for smooth functioning of the School. The working group consists of the following personalities:

Prof. N. R. Bandopadhyay, School of Material Science and Engineering

Prof. P K Das, Dept. of AEAM

Prof. Rana Roy, Dept. of AEAM

Prof. Mukhopadhyay, Dept of Arch. Town and Regional Planning

Prof. S Dalui, Dept, of Civil Engg.

Er S Kar, University Engineer, BESUS

13. The following analyser has been purchased for the model studies
- (a) OR36-FREQ-4 & OR-36/8-XPD-B: 4 channel analyzer
  - (b) 731-207: Seismic Accelerometer
  - (c ) Pore pressure sensor
  - (d) Multichannel display for pore pressure sensor

## HORIZONTAL SHAKE UNIT

### 1.0 INTRODUCTION

For the last few years there were several fatal earthquakes throughout the world which came as an ultimate disaster over the human civilization and took toll thousands of life and caused enormous damage in the properties. Modern civilization demand urban & rural development in very quick pace which ultimately results in increasing number of engineering structures as well as non-engineering structures throughout the world. At the same time it is increasing the probability of damage occurred due to earthquake. This situation is boosting up the research & development works in 'Disaster Management & Studies' field to develop knowledge and technologies which will be used to develop smart structures which can withstand earthquake shocks and thus minimize the overall damage.

To study the earthquake, prime & most important challenge is simulation of earthquake signal. The system used for this purpose is called a Seismic Vibration Shaker which generates real time to & fro motion and earthquake like movement on a Square Table. The structure under test is placed on the table and hence it is being excited by the table movement. Dynamic response of the structure is then studied and thus one can analyze its various structural parameters and design aspects.



**FIG. A: SINGLE AXIS SEISMIC SHAKE TABLE WITH BASE PLATE**

### **SERVO HYDRAULIC CONTROLLED SHAKER SYSTEM**

Total System Consist of following two main parts —

- (a) Mechanical & Hydraulic Part, and,
- (b) Controller Part.

The installed horizontal shaking unit has the following applications:

- Earth Quake Signal Simulation & Control.
- Structural Vibration Study.
- Reliability Study of Engineering and Non-Engineering Structures.

#### **(A) Mechanical and Hydraulic Part**

The sub-parts of the mechanical and hydraulic part are as follows —

- a) Horizontal single Axis Seismic Table 1.5 m x 1.5 m.
- b) Hydraulic Linear Actuator.
- c) Hydraulic Service Manifold.
- d) Hydraulic Power Supply.
- e) Servo Control System.
- f) Hydraulic Oil Cooling System ( Heat Exchanger + Pump)

Photographs of the different sub-parts of the mechanical and hydraulic part are given below.





**FIG. B1: SERVO HYDRAULIC  
LINEAR ACTUATOR**



**FIG. B2: SERVO HYDRAULIC LINEAR  
ACTUATOR ASSEMBLY**



**FIG. C1 & C2: HYDRAULIC SERVICE MANIFOLD**

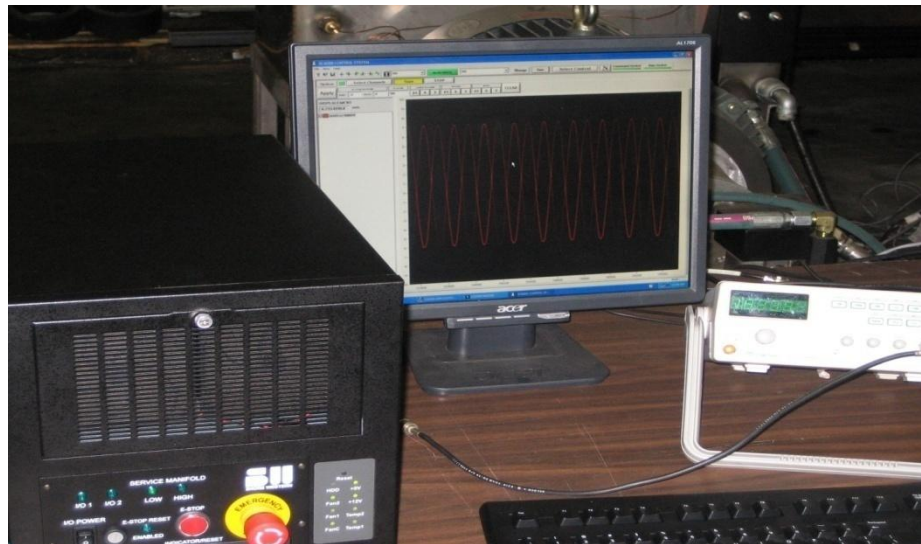


**FIG D: HYDRAULIC POWER SUPPLY**





**FIG. E1 & E2: SERVO CONTROL SYSTEM**



**FIG. E3: SERVO CONTROL SYSTEM**





**FIG. F1 & F2: HYDRAULIC OIL COOLING SYSTEM (HEAT EXCHANGER + PUMP)**

**Controller Part** (JAGUR Main Controller, Data Acquisition & Analysis):

- i) 8 inputs Channels & 1 Output channel.
- ii) Data Acquisition and analysis Software.
- iii) Sine, Random & Shock Vibration Control Hardware along with Software.
- iv) Random Vibration Control Software.
- v) MIMO Shock Vibration Control Software (Multi Shaker Controller)
- vi) Earthquake signal simulation through close loop control system.
- vii) Controller cum Data Acquisition and Analyzer System.
- viii) MATLAB Software.
- ix) Can control additional 5 number Actuators.

Photograph of the different sub-parts of the Controller Part are given below.

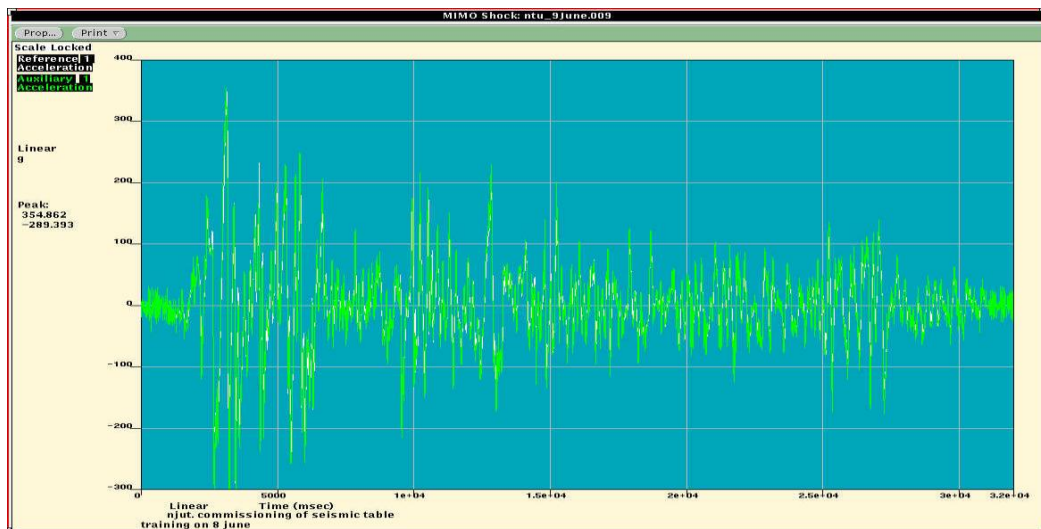


**FIG. G: HEART OF SEISMIC SHAKER ( JAGUAR CONTROLLER)**





**FIG. H1 : EARTHQUAKE SIGNAL ON JAGUAR DISPLAY**



**FIG. H2: EARTHQUAKE SIGNAL ON JAGUAR DISPLAY**





**FIG. I1 & I2: COMPLETE SYSTEM  
TRAINING AND DEMONSTRATION ON 28<sup>TH</sup> MAY, 2008**



**FIG. J1: TRAINING AND DEMONSTRATION**



**FIG. J2: TRAINING AND DEMONSTRATION**



**TRAINING AND DEMONSTRATION ON 28<sup>TH</sup> MAY, 2008**



**FIG. J3: TRAINING AND  
DEMONSTRATION**



**FIG. J4: TRAINING AND  
DEMONSTRATION**



**FIG. J5: TRAINING AND  
DEMONSTRATION**



**FIG. J6: TRAINING AND  
DEMONSTRATION**



**FIG. J7: TRAINING AND  
DEMONSTRATION**



**FIG. J8: TRAINING AND  
DEMONSTRATION**



***School of Safety and Occupational  
Health Engineering***





## About the department

*Bengal Engineering & Science University, Shibpur introduced a part-time Postgraduate programme in safety and Occupational Health Engineering with effect from August 2007, the first of its kind in India. It is a resolute step towards achieving excellence in the arena of Science and Technology which has been the motto of the institution since its inception.*

*The university functions as research-intensive university of which the prime areas of activity are:*

- *Creation of knowledge*
- *Dissemination of knowledge*

*In an environment of research which ensures that teaching and learning are conditioned by the latest research and that the nation is endowed with skilled manpower of the highest quality.*

- *The above are being achieved with the help of qualified and motivated faculties, highly motivated students and the state of the art of the laboratory.*
- *Study of Safety and Occupational Health (SOH) is required because in view of the dramatic change in the world of work, global, domestic and in local contexts, the current occupational and environmental health research and education plans and diverse occupational pursuits and hazards. The modest endeavor of the national centres provides directions and success indicators for national and international level promotion in safety and occupational health environment.*
- *The success indicator of SOH national programmes may be seen by innovative approaches, to develop resource base for societal, local government and corporate interaction and communication.*
- *The core competency on human resource as well as quality delivery of SOH services will be to create many more research and learning centres and strengthen existing infrastructures into quality standard laboratories.*
- *The current education and awareness programme of SOH primarily concentrate on sector of organized industries. Greater endeavor is demanded to informal and farming and other vulnerable sectors, including women, children and slderly workforce and need-based attempts will increase knowledge potentials of the sector.*
- *The provision require strengthening the elements of a management system in defining SOPH goals and objectives, performance measures measures, programs and procedures and continual improvement.*

### Academic Programmes:

|  |  |
|--|--|
| <b>Undergraduate Level</b>   | N.A.   |
| i. Degree offered  |  |
| ii. Sanctioned students' intake  |  |
| iii. Additional intake through lateral entry in 3 <sup>rd</sup> Semester |  |
| <b>Postgraduate Level</b>  |  |
| i. Degree offered  | M.Tech. (School of Safety and Occupational Health Engineering) |
| ii. Sanctioned students' intake  | 18   |
| iii. Additional intake through other programmes (i.e. QIP)               | N.A.   |
| iv. Specialisations in   | N.A.   |
| <b>Doctoral Level</b>  |  |
| i. Degree offered  | Ph.D.  |
| ii. No of candidates enrolled  | two  |
| registered   | nil  |
| awarded  | two  |

**Faculty position:**Sanctioned faculty post... *N.A.*.... Vacant Post ... *N.A.*.....

(a) Faculty profile ( in the following table )

| Name                                | Designation   | Highest Qualification    | Specialization / Research Area | Contact No. E-mail |
|-------------------------------------|---|--------------------------|--------------------------------|--------------------|
| <i>Dr. B. K. Bhattacharyya</i>      | <i>Professor (Mechanical) &amp; Director of the School</i>                      | <i>M.E., Ph.D.</i>       | <i>Management</i>              |                    |
| <i>Prof. P. K. Lai</i>              | <i>Assistant Professor (Civil Engg.)</i>  | <i>M.E.</i>              |                                |                    |
| <i>Dr. P Daw</i>                    | <i>A. P (Prod. Engg.) WBUT</i>  | <i>M.E., Ph.D.</i>       |                                |                    |
| <i>Dr. D. Moulik</i>                | <i>Environmental Engineer, WBPCB</i>  | <i>M.E., Ph.D.</i>       |                                |                    |
| <i>Mr. R. N. Bishnu</i>             | <i>Inspector of Factories (Chemical)</i>  | <i>M.Tech.</i>           |                                |                    |
| <i>Dr. A. K. Majumder</i>           | <i>Ex. Director, CLI, Mumbai</i>  | <i>M.Sc., Ph.D.</i>      |                                |                    |
| <i>Mr. U. K. Das</i>                | <i>Director (Safety), RLI</i>   | <i>M.E.</i>              |                                |                    |
| <i>Dr. Prasun Das</i>               | <i>Technical Officer, Grade-I (Equi. To Asso. Prof.) ISI, SQC &amp; OR Unit</i> | <i>M.S., Ph.D.</i>       |                                |                    |
| <i>Mr. Subir Ghosh</i>              | <i>Retd. Jt. Chief Inspector of Factories (Chemical)</i>                        | <i>B.C.H.E., M.Phil.</i> |                                |                    |
| <i>Dr. Amalendu Samanta</i>         | <i>Ex-Scientist, All India Inst. Of Hygiene &amp; Public Health</i>             | <i>Ph.D.</i>             |                                |                    |
| <i>Prof. Shankarashis Mukherjee</i> | <i>Professor, Calcutta University</i>   | <i>M.Sc., M.Tech.</i>    |                                |                    |
| <i>Mr. D. B. Deb</i>                | <i>Ex. Dy. Director General, DGFASLI, Present Co-ordinator of the School</i>    | <i>B.E.</i>              |                                |                    |

**Research area** (only mention broad titles without description in detail):

- *Ergonomics*
- *Waste Management*
- *Occupational Health Engineering*
- *Identifying Critical Success Factors & Effectiveness Measurement System of Six Sigma Initiatives in Business Processes*

**Research facilities:** (name specific equipment / picture etc.)

- Noise Exposure Monitor
- Heat Stress Monitor
- Ergonomic Bicycle

**Name of the laboratories:**

|  |   |
|--|---|
| <i>Ergonomic Lab</i>                   | <i>Set up</i>   |
| <i>Environmental Lab</i>               |   |
| <i>Occupational Health Hygiene Lab</i> | <i>Data Logging Area Heat Stress Monitor, Personal Noise Exposure Monitor</i> |

**Consultancy Work:** *Conducting Safety Audit for CESC Ltd., Kolkata, of five districts Distribution Network & two Generation Station in West Bengal*

**Support staff position:**

(a) (i) Sanctioned technical post.....

(ii) Technical staff profile (in the following table)

| Name | Designation | Highest Qualification | Contact No. | E-mail |
|------|-------------|-----------------------|-------------|--------|
|      |             |                       |             |        |

**Others**

- i) Keynote address by the Director, 19<sup>th</sup> International Conference on “Industrial Engineering and Management” during Sept. 1 – 5, 2012, at Changshah, China.
- ii) Keynote address by the Director, 20<sup>th</sup> International Conference on “Industrial Engineering and Management” during Jan. 5 – 7, 2013, at Bali, Indonesia.
- iii) Keynote address by the Director, on “Industrial Engineering and Management” during 2015, at China.
- iv) Invited distinguished Engineering Education speaker – 4<sup>th</sup> Conference of Industry Engineering & Operation Management, Bali, Indonesia.



***Purabi Das School of Information  
Technology***



## About the Department

The **Purabi Das School of Information Technology (PDSIT)** is established at Bengal Engineering and Science University, Shibpur (BESUS). The School is a collaborative effort of BECDU, Purabi Das Foundation (USA), Research Engineers Inc. (USA) and CMC Ltd. The School has been established with an aim to provide best quality teaching and training in the field of IT. The mandate before PDSIT is to establish itself as a leading centre of excellence. The other essential prerequisite is that - PDSIT should be financially self-supporting from the day one with no burden on the University or Government budget. In close collaboration with IT industries, PDSIT offers postgraduate degree courses.

## Academic Programmes

### Undergraduate Level

*PDSIT do not conduct Undergraduate Course*

### Postgraduate Level

**M. Tech in Information Technology** The M.Tech program is a three-year, 6 semester Evening Course. The student has to take a set of core courses and a set of electives. The course work is spread across the first to fourth semesters with an option of taking one elective in the fifth semester. This is followed by a project in the fifth and sixth semester in which the student can take up a project of his or her interest, supervised by a faculty member.

#### Student's intake

|   | U.G | P.G | Ph.D                          |
|---|-----|-----|-------------------------------|
| Sanctioned students' intake                     | Nil | 36  | Awarded - 2<br>Registered - 3 |
| Additional intake through lateral entry/<br>QIP | Nil | -   |                               |

#### a. Doctoral Level

**PhD in Information Technology:** The PhD. programs are postgraduate research oriented programs. The scholar works in an area of his/her interest under the supervision of a faculty member. The scholar has to obtain a minimum number of credits by taking courses. The highlight of the program is the independent research work taken by a scholar, leading to a dissertation at the end of the program. The average duration of a PhD. program is between four to five years.

#### Ph. D Activities

**PhD. Awarded during 2014 - 2015 session :** 1(one)

#### PhD. Registered

1. Soumyabrata Ghosh, Thesis topic: "Theory and Application of Cellular Automata for Biological Sequence Analysis."
2. Sandip Banerjee, Thesis topic: "Studies in Geometric Algorithms for Layout Design and Visualization"
3. Soumik Nag, Thesis topic:



**Faculty Position:****Sanctioned Faculty Post   2   Vacant Post****(a) Faculty Profile ( in the following table)**

| <b>Faculty Name</b>            | <b>Designation</b>            | <b>Highest Qualification</b> | <b>Specialization/ Research Area</b>  | <b>Contact No. / Mail Id</b>   |
|--------------------------------|-------------------------------|------------------------------|---|--|
| Dr.Arindam Biswas              | Director                      | Ph.D                         | <ul style="list-style-type: none"><li>○ Digital Geometry</li><li>○ Image Processing and Pattern Recognition</li></ul>                                   | <a href="mailto:abiswas@it.becs.ac.in">abiswas@it.becs.ac.in</a><br><a href="mailto:barindam@gmail.com">barindam@gmail.com</a> |
| Prof. Sekhar Mandal            | Associate Professor           | Ph. D                        | <ul style="list-style-type: none"><li>○ Image Processing and Pattern Recognition, Database Management Systems</li></ul>                                 | <a href="mailto:sekhar@cs.becs.ac.in">sekhar@cs.becs.ac.in</a>   |
| Prof. Suryasarathi Barat       | Professor ( Visiting Faculty) | M.Sc. M.Tech                 | <ul style="list-style-type: none"><li>○ Data Base Management System,RF ID &amp; System Biology</li></ul>  | <a href="mailto:Sbarat@hotmail.com">Sbarat@hotmail.com</a>   |
| <u>Dr. Prasun Ghosal</u>       | Assistant Professor           | Ph.D                         | <ul style="list-style-type: none"><li>○ 3D Integration of VLSI Physical Design</li><li>○ Network-On-Chip</li><li>○ Design of Embedded Systems</li></ul> | <a href="mailto:p_ghosal@it.becs.ac.in">p_ghosal@it.becs.ac.in</a>   |
| <u>Prof. Indrajit Banerjee</u> | Assistant Professor           | M.Tech                       | <ul style="list-style-type: none"><li>○ Wireless ad-hoc</li></ul>   | <a href="mailto:ibanerjee@it.becs.ac.in">ibanerjee@it.becs.ac.in</a>   |
| <u>Dr. Chandan Giri</u>        | Assistant Professor           | Ph.D                         | <ul style="list-style-type: none"><li>○ VLSI digital Circuit Testing</li><li>○ System-On-Chip Testing</li><li>○ Network-On-Chip Testing</li></ul>       | <a href="mailto:chandangiri@gmail.com">chandangiri@gmail.com</a>   |

|                      |  |        |  |  |
|----------------------|--|--------|--|--|
| Mr. Pranab Roy       | Assistant Professor                    | M.Tech | ○ VLSI Physical Design                               | <a href="mailto:Ronmarrine14@yahoo.co.in">Ronmarrine14@yahoo.co.in</a>   |
| Dr. Asit Kumar Das   | Assistant Professor                    | Ph.D   | ○ Data mining and Pattern Recognition                | <a href="mailto:akdas@cs.becs.in">akdas@cs.becs.in</a>   |
| Prof. Apurba Sarkar  | Assistant Professor                    | M.Tech | ○ Digital Geometry                                   | <a href="mailto:sarkar@cs.becs.ac.in">sarkar@cs.becs.ac.in</a> ,<br><a href="mailto:sarkarapurba@yahoo.co.in">sarkarapurba@yahoo.co.in</a> |
| Dr. Dipak Kumar Kole | Assistant Professor (Visiting Faculty) | Ph.D   | ○ Synthesis and Testing of Reversible Logic Circuits | <a href="mailto:dipak.kole@gmail.com">dipak.kole@gmail.com</a>   |

## Research area

**Digital Geometry, Medical Image Analysis, Sensor Networks**

## International Journal

1. P Chanak, I Banerjee, “Energy efficient fault-tolerant multipath routing scheme for wireless sensor networks”, Elsevier, The Journal of China Universities of Posts and Telecommunications 20 (6), 42-61.
2. Prasenjit Chanak, Hafijur Rahaman, Tuhina Samanta, Indrajit Banerjee “FTMRS: Fault Tolerance Routing Scheme for Wireless Sensor Network”, International Journal of Wireless & Mobile Networks, Vol. 5, No. 2, April 2013
3. N. Karmakar, A. Biswas, P. Bhowmick, and B. B. Bhattacharya, A Combinatorial Algorithm to Construct 3D Isothetic Covers, International Journal of Computer Mathematics, 2012 (accepted), DOI:10.1080/00207160.2012.734813.
4. M. Dutt, A. Biswas, and P. Bhowmick, Approximate Partitioning of 2D Objects into Orthogonally Convex Components, Computer Vision and Image Understanding, Vol. 117(4), pp. 326 - 341, 2013, DOI: 10.1016/j.cviu.2012.08.017.
5. A. Biswas, P. Bhowmick, M. Sarkar, and B. B. Bhattacharya, A Linear-time Combinatorial Algorithm to Find the Orthogonal Hull of an Object on the Digital Plane, *Information Sciences*, Elsevier, 2012, DOI: 10.1016/j.ins.2012.05.029.
6. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, On the Representation of a Digital Contour with an Unordered Point Set for Visual Perception, *Journal of Visual Communication and Image Representation*, Vol. 22(7), pp. 590 – 605, 2011, DOI: 10.1016/j.jvcir.2011.07.005.
7. S. Chatterjee, R. Karim, A. Biswas , A. K. Ray, Image Processing of Ultrasound Color Doppler to Characterize Malignant Breast Lesion, *Advanced Materials Research Journal (AMR)*, Vol. 403 – 408, pp. 830 – 834, 2011, DOI: 10.4028/www.scientific.net/AMR.403-408.830, ISSN:1022-6680.
8. S. Chatterjee, A. K. Ray, R. Karim, and A. Biswas, Architectural Design to Characterize Malignant Breast Lesion, *International Journal of Computer Applications*, Vol. 31(11), pp. 8-15, 2011, DOI: 10.5120/3939-5529, ISBN: 978-93-80865-13-7.
9. M. Dutt, A. Sarkar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Efficient Word Segmentation and Baseline Localization in Handwritten Documents Using Isothetic Covers, *International Journal of Digital Library Systems*, Vol. 2(3), pp. 1 – 13, 2011, DOI: 10.4018/jdls.2011070101.
10. M. Dutt, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, On Finding an Orthogonal Convex Skull of a Digital Object, *International Journal of Imaging Systems and Technology*, Vol. 21(1), pp. 14 – 27, 2011, DOI: 10.1002/ima.20266.

11. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, Construction of Isothetic Covers of a Digital Object: A Combinatorial Approach, *Journal of Visual Communication and Image Representation*, Vol. 21(4), pp. 295 – 310, 2010, DOI: 10.1016/j.jvcir.2010.02.001.
12. S. Pal, P. Bhowmick, A. Biswas, and B.B. Bhattacharya, Understanding Digital Documents Using Gestalt Properties of Isothetic Components, *International Journal of Digital Library Systems*, Vol. 1(3), pages 1 – 25, 2010, DOI: 10.4018/jdls.2010070101
13. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, Archival Image Indexing with Connectivity Features using Randomized Masks, *Applied Soft Computing*, Vol. 8(4), pages 1625 – 1636, September 2008, DOI:10.1016/j.asoc.2007.05.020.
14. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, Shape Codes and Their Applications to Image Retrieval, *Electronic Letters on Computer Vision and Image Analysis (ELCVIA)*, Vol. 7(2), pp. 62 – 75, 2008.
15. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, Thinning-free Polygonal Approximation of Thick Digital Curves Using Cellular Envelope, *Electronic Letters on Computer Vision and Image Analysis(ELCVIA)*, Vol. 7(2), pp. 76 – 95, 2008.
16. Prasenjit Chanak, Hafijur Rahaman, Tuhina Samanta, Indrajit Banerjee “FTMRS: Fault Tolerance Routing Scheme for Wireless Sensor Network”, *International Journal of Wireless & Mobile Networks*, Vol. 5, No. 2, April 2013.
17. Indrajit Banerjee, Anirban Datta, Sonalisa Pal, Soujanya Chatterjee, Tuhina Samanta, “A Novel Fault Detection and Replacement Scheme in WSN”, *Second International Symposium on Intelligent Informatics (ISI'13)*, 23-24, August 2013.
18. Supantha Das, Indrajit Banerjee, and Tuhina Samanta, “Sensor Localization and Obstacle Boundary Detection Algorithm in WSN”, *Third International Conference on Advances in Computing and Communications (ACC-2013)*, 29-31 August 2013.
19. Indrajit Banerjee, Prasenjit Chanak, Tuhina Samanta, Hafijur Rahaman “EFDR: Effective Fault Detection and Routing Scheme for Wireless Sensor Network”, *International Journal of Computers & Electrical Engineering*, Elsevier (Accepted), 2013.
20. Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee, “Quad Tree Approach for Obstacle Discovery and Tracking in Wireless Sensor Networks”, *IEEE SENSOR 2013*, Baltimore, USA, 3-6 November 2013.
21. Ritwik Mukherjee, Hafizur Rahaman, Indrajit Banerjee, Tuhina Samanta, and Parthasarathi Dasgupta, “A Heuristic Method for Co-optimization of Pin Assignment and Droplet Routing in Digital Microfluidic Biochip” Accepted for appearing in *Proceedings of International Conference on VLSI Design (VLSID 2012)*, to be held at Hyderabad, January 2012
22. Srimanta Halder, Monomita Mazumdar, Prasenjit Chanak, Indrajit Banerjee, “FTLBS: Fault Tolerant Load Balancing Scheme in Wireless Sensor Network” *Advances in Computing and Information Technology, Advances in Intelligent Systems and Computing*, Springer,
23. Monomita Mazumdar, Srimanta Halder, Prasenjit Chanak, Indrajit Banerjee, “DARIH: Distributed Adaptive Routing via Information Highway in Sensor Network”, *Advances in Computing and Information Technology, Advances in Intelligent Systems and Computing*, Springer,
24. Indrajit Banerjee, Prasenjit Chanak, Hafizur Rahaman, and Nachiketa Das, "GBFTS: Group Based Fault Tolerant Scheme in Wireless Sensor Networks,"

25. Nachiketa Das, Hafizur Rahaman and Indrajit Banerjee “BIST to Diagnosis Delay Fault in the LUT of Cluster Based FPGA”, International Journal of Information and Electronics Engineering, Vol. 2, No. 2, March 2012.
26. Prasenjit Chanak, Indrajit Banerjee, Tuhina Samanta, Hafizur Rahaman, “FFMS: Fuzzy Based Fault Management Scheme in Wireless Sensor Network”, Eco-friendly Computing and Communication Systems, Communications in Computer and Information Science, Springer, Volume 305, 2012, pp 30-38.
27. Snehansu Bank, Surata Saha, Indrajit Banerjee, “An Analytical Model on Wireless Sensor Networks”, International Conference on Computer Science and Engineering, April 28<sup>th</sup>, 2012. Pp:17-20.
28. Banerjee Indrajit; Chanak Prasenjit; Samanta Tuhina; Rahaman Hafizur, “Fuzzy rule-based faulty node classification and management scheme in wireless sensor network” Communicated to IEEE Transactions on Parallel and Distributed Systems.
29. Prasenjit Chanak, Tuhina Samanta, Hafizur Rahaman and Indrajit Banerjee, “Obstacle Discovery and Localization Scheme for Wireless Sensor Network”, CODIS 2012, 28-29<sup>th</sup> December, 2012, pp-262-265.
30. Indrajit Banerjee, Indrani Roy, Ahana Roy Choudhury, Biswarup Das Sharma and Tuhina Samanta, “Shortest Path Based Geographical Routing Algorithm in Wireless Sensor Network”, CODIS 2012, 28-29<sup>th</sup> December, 2012 pp-266-269.
31. **Prasun Ghosal**, and Tuhin Subhra Das, "Improved Extended XY On-Chip Routing in Diametrical 2D Mesh NoC", International Journal of VLSI design & Communication Systems (VLSICS) Vol.3, No.5, October 2012, pp. 191-200.; DOI : 10.5121/vlsic.2012.3516
32. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "Particle Swarm Optimization of Speed in Unplanned Lane Traffic", International Journal of Artificial Intelligence & Applications (IJAIA), Vol.3, No.4, July 2012, pp. 51-63. DOI : 10.5121/ijaia.2012.3404
33. **Prasun Ghosal**, Arijit Chakraborty, Sabyasachee Banerjee, and Satabdi Barman, "Speed Optimization in Unplanned Traffic Using Bio-inspired Computing And Population Knowledge Base", Computer Science & Engineering: An International Journal (CSEIJ), Vol. 2, No. 3, June 2012, pp. 79-97. DOI : 10.5121/cseij. 2012.2307
34. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "Computational Optimization of Speed in an Unplanned Lane Traffic", IEM International Journal of Management & Technology (IEMITMT) [ISSN: 2296-6611], pp. 160-163.
35. **Prasun Ghosal**, Arijit Chakraborty, Sabyasachee Banerjee, "Design of Knowledge Based Efficient Speed Optimization Algorithm in Unplanned Traffic", The IUP Journal of Computer Sciences, Vol. VI, No. 1, pp. 23-30, January 2012.
36. **I Banerjee**, R Banerjee, K Ray, S Bhattacharjee, S Guha, , I Nath “A study of insulin resistance and its clinico-metabolic associations among apparently healthy individuals attending a tertiary care hospital” Annals of Medical and Health Sciences Research 4 (5), 823.
37. Moumita Samanta, **Indrajit Banerjee**, “Optimal load distribution of cluster head in fault-tolerant wireless sensor network” , Electrical, Electronics and Computer Science (SCEECS), 2014 IEEE Students' Conference on, IEEE, 2014/3/1.
38. N Ghosh, **I Banerjee**, T Samanta, “Energy efficient coverage of static sensor nodes deciding on mobile sink movements using game theory” , Applications and Innovations in Mobile Computing (AIMoC), 2014, 118-125.

39. S Mukherjee, **I Banerjee**, T Samanta, "Defect aware droplet routing technique in digital microfluidic biochip", Advance Computing Conference (IACC), 2014 IEEE International, 30-35.
40. P Chanak, **I Banerjee**, "Path Discovery for Sinks Mobility in Obstacle Resisting WSNs" Advanced Computing, Networking and Informatics-Volume 2, 39-50.
41. **Indrajit Banerjee**, Anirban Datta, Sonalisa Pal, Soujanya Chatterjee, Tuhina Samanta "A Novel Fault Detection and Replacement Scheme in WSN", Recent Advances in Intelligent Informatics, Springer International Publishing, 303-310.
42. Prasenjit Chanak, **Indrajit Banerjee**, "Load reduction with multiple mobile sinks in wireless sensor networks", Students' Technology Symposium (TechSym), 2014 IEEE, 121-125

### **International Conferences**

1. Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee, "Quad Tree Approach for Obstacle Discovery and Tracking in Wireless Sensor Networks", IEEE SENSOR 2013, Baltimore, USA, 3-6 November 2013, pp: 1362-1365.
2. Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee, "Cluster Head Load Distribution Scheme for Wireless Sensor Networks", IEEE SENSOR 2013, Baltimore, USA, 3-6 November 2013, pp: 1727-1730
3. Supantha Das, Indrajit Banerjee, and Tuhina Samanta, "Sensor Localization and Obstacle Boundary Detection Algorithm in WSN", Third International Conference on Advances in Computing and Communications (ACC-2013), 29-31 August 2013
4. A. Mukherjee, U. Garain, and A. Biswas, Evaluation of the Graphical Representation for Text-to-Graphic Conversion Systems, 10th IAPR International Workshop on Graphics Recognition, Lehigh University, Bethlehem, PA, USA, Aug. 20-21, 2013 (accepted).
5. J. K. Das, S. K. Saha, and A. Biswas, Depth from Images Of External Outdoor Scenes, 8th Indian Conference on Computer Vision, Graphics and Image Processing: ICVGIP'12, Mumbai, India, ACM, New York, NY, USA, , Article 17 , pp. 1-7, Dec. 16 - 19, 2012.
6. S. Phani, S. Lahiri, and A. Biswas, Culturomics On A Bengali Newspaper Corpus, International Conference on Asian Language Processing 2012 (IALP 2012), Hanoi, Vietnam, pp. 237-240, Nov. 13-15, 2012.
7. N. Karmakar, A. Biswas, and P. Bhowmick, Fast Slicing of Orthogonal Covers Using DCEL, 15th International Workshop on Combinatorial Image Analysis: IWCIA'12, Austin, Texas, USA, Lecture Notes in Computer Science (LNCS), Springer, Vol. 7655, pp. 16 – 30, Nov. 28–30, 2012.
8. M. Dutt, A. Biswas, P. Bhowmick, and B. B. Bhattacharya, On Finding Shortest Isothetic Path inside a Digital Object, 15th International Workshop on Combinatorial Image Analysis: IWCIA'12, Austin, Texas, USA, Lecture Notes in Computer Science (LNCS), Springer, Vol. 7655, pp. 16 – 30, Nov. 28–30, 2012.
9. S. Chatterjee, A. K. Ray, R. Karim, A. Biswas, Classification of Malignant Tumors Using Multiple Sonographic Features, IEEE Proceedings of the International Conference on Recent Trends in Information Systems(ReTIS-2011), pp. 252 – 256, Dec. 21 – 23, 2011, Jadavpur University, Kolkata, India.
10. S. Chatterjee, A. K. Ray, R. Karim, A. Biswas, Micro-calcification Detection to Characterize Malignant Breast Lesion, Annual IEEE India Conference (INDICON 2011), pp. 1 – 4, Dec. 16 – 18, 2011 Hyderabad, India.

11. S. C. Dutta, A. Biswas, S. Mitra, and C. Saha, Extraction of Lip Region from Video Sequences of Basic Facial Expressions, in Proc. of International Conference on Computational vision and Robotics: ICCVR'11, Aug. 13 – 14, 2011 (accepted).
12. N. Karmakar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Construction of 3D Orthogonal Cover of a Digital Object, in Proc. of 14<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'11, Madrid, Spain, Lecture Notes in Computer Science (LNCS), Springer, Vol. 6636, pp. 70 – 83, May 23 – 25, 2011, DOI:10.1007/978-3-642-21073-0\_9.
13. S. Chatterjee, R. Karim, A. Biswas, A. K. Ray, Image Processing of Ultrasound Color Doppler to Characterize Malignant Breast Lesion, in Proc. of International Conference on Control, Robotics and Cybernetics: ICCRC'11, New Delhi, India, IEEE Catalog Number: CFP1176M-PRT, ISBN: 978-1-4244-9709-6, pp. VI: 159 – 162, Mar 21 – 23, 2011.
14. M. Dutt, A. Biswas, and P. Bhowmick, ACCORD: With Approximate Covering of Convex Orthogonal Decomposition, in Proc. of 16<sup>th</sup> IAPR International Conference on Discrete Geometry for Computer Imagery: DGCI'11, Nancy, France, Lecture Notes in Computer Science (LNCS), Springer, Vol. 6607, pp. 489 – 500, April 6 – 8, 2011, DOI:10.1007/978-3-642-19867-0\_41.
15. S. Pal, P. Bhowmick, and A. Biswas, FACET: A Fast Approximate Circularity Estimation Technique, in Proc. of 2<sup>nd</sup> International Conference of Emerging Applications of Information Technology: EAIT'11, Kolkata, India, IEEE CS Press, pp. 106 – 109, February 19 – 20, 2011, DOI: 10.1109/EAIT.2011.45.
16. A. Sarkar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Combinatorial Construction of the Orthogonal Concavity Tree of a Digital Object, in Proc. of 2<sup>nd</sup> International Conference of Emerging Applications of Information Technology: EAIT'11, Kolkata, India, IEEE CS Press, pp. 210 – 213, 2011, DOI: 10.1109/EAIT.2011.55.
17. S. Pratihari, S. Pal, P. Bhowmick, A. Biswas, and B.B. Bhattacharya, Recognition of Hand-drawn Graphs Using Digital-geometric Techniques, in Proc. of 12<sup>th</sup> International Conference on Frontiers in Handwriting Recognition: ICFHR'10, Kolkata, India, IEEE Computer Society, pp. 89 – 94, November 16 – 18, 2010, DOI: 10.1109/ICFHR.2010.20.
18. A. Sarkar, A. Biswas, P. Bhowmick, and B.B. Bhattacharya, Word Segmentation and Baseline Detection in Handwritten Documents Using Isothetic Covers, in Proc. of 12<sup>th</sup> International Conference on Frontiers in Handwriting Recognition: ICFHR'10, Kolkata, India, IEEE Computer Society, pp. 445 – 450, November 16 – 18, 2010, DOI: 10.1109/ICFHR.2010.76.
19. A. Biswas, M. Dutt, P. Bhowmick, and B. B. Bhattacharya, On Finding the Orthogonal Convex Skull of a Digital Object, in Proc. of 13<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'09, Playa del Carmen, Mexico, Research Publishing Services, *Editors*: Petra Wiederhold and Reneta P. Barneva, pp.25 – 36, November 24 – 27, 2009.
20. S. Pal, P. Bhowmick, A. Biswas, and B. B. Bhattacharya, GOAL: Towards understanding of Graphic Objects from Architectural to Line drawings, in Proc. of 8<sup>th</sup> International Workshop on Graphics Recognition: GREC'09, La Rochelle, France, Lecture Notes in

21. A. Biswas, M. Sarkar, P. Bhowmick, and B. B. Bhattacharya, Finding the Orthogonal Hull of a Digital Object: A Combinatorial Approach, in Proc. of 12<sup>th</sup> International Workshop on Combinatorial Image Analysis: IWCIA'08, Buffalo, USA, Lecture Notes in Computer Science (LNCS), Springer, Vol. 4958, pp. 124 – 135, April 7 – 9, 2008, DOI:10.1007/978-3-540-78275-9\_11.
22. A. Biswas, S. Khara, P. Bhowmick, and B. B. Bhattacharya, Extraction of Regions of Interest from Face Images Using Cellular Analysis, in Proc. of 1<sup>st</sup> Bangalore Annual Compute Conference: COMPUTE'08, Indian Institute of Science, Bangalore, India, ACM, Article No. 15, pp. 1 – 8, January 18 – 20, 2008, DOI: 10.1145/1341771.1341787.
23. B. B. Bhattacharya, A. Biswas, P. Bhowmick, and T. Acharya, A Fast On-chip Mean Filter Requiring only Integer Operations, in Proc. of SPIE, Vol. 6822, 682217, SPIE VCIP (Visual Communication and Image Processing) Conference, California, January 26 – 31, 2008, DOI: 10.1117/12.776602.
24. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, Characterization of Isothetic Polygons for Image Indexing and Retrieval, in Proc. of International Conference on Computing: Theory and Applications: ICCTA'07, Kolkata, India, IEEE CS Press, pp. 590 – 594, March 5 – 7, 2007, DOI: 10.1109/ICCTA.2007.36.
25. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, ICE: The Isothetic Convex Envelope of a Digital Object, in Proc. of International Conference on Computing: Theory and Applications: ICCTA'07, Kolkata, India, IEEE CS Press, pp. 219 – 223, March 5 – 7, 2007, DOI: 10.1109/ICCTA.2007.70.
26. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, Ranking of Optical Character Prototypes Using Cellular Lengths, in Proc. of International Conference on Computing: Theory and Applications: ICCTA'07, Kolkata, India, IEEE CS Press, pp. 422 – 426, March 5 – 7, 2007, DOI: 10.1109/ICCTA.2007.109.
27. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, SCOPE: Shape Complexity of Objects using Isothetic Polygonal Envelope, in Proc. of 6<sup>th</sup> International Conference on Advances in Pattern Recognition: ICAPR'07, Kolkata, India, Advances in Pattern Recognition, pp. 356 – 360, January 2 – 4, 2007, DOI: 10.1142/9789812772381\_0060.
28. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, DRILL: Detection and Representation of Isothetic Loosely Connected Components without Labeling, in Proc. of 6<sup>th</sup> International Conference on Advances in Pattern Recognition: ICAPR'07, Kolkata, India, Advances in Pattern Recognition, pp. 343 – 348, January 2 – 4, 2007, DOI: 10.1142/9789812772381\_0058.
29. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, PACE: Polygonal Approximation of Thick Digital Curves Using Cellular Envelope, in Proc. of 5<sup>th</sup> Indian Conference on Computer Vision, Graphics and Image Processing: ICVGIP'06, Madurai, India, Lecture Notes in Computer Science (LNCS), Springer, Vol. 4338, pp. 299 – 310, December 13 – 16, 2006, DOI: 10.1007/11949619\_27.
30. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, MuSC: Multigrid Shape Codes and Their Applications to Image Retrieval, in Proc. of International Conference on

31. P. Bhowmick, A. Biswas, and B. B. Bhattacharya, Isothetic Polygons of a 2D Object on Generalized Grid, in Proc. of 1<sup>st</sup> International Conference on Pattern Recognition and Machine Intelligence: PReMI'05, Kolkata, India, Lecture Notes in Computer Science (LNCS), Springer, Vol. 3776, pp. 407 – 412, Dec. 20 – 22, 2005, DOI:10.1007/11590316\_62.
32. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, Reconstruction of Torn Documents Using Contour Maps, in Proc. of International Conference on Image Processing: ICIP'05, Genoa, Italy, IEEE CS Press, pp. III:517 – 520, September 11 – 14, 2005, DOI: 10.1109/ICIP.2005.1530442.
33. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, TIPS: On Finding a Tight Isothetic Polygonal Shape Covering a 2D Object, in Proc. of 14<sup>th</sup> Scandinavian Conference on Image Analysis: SCIA'05, Joensuu, Finland, Lecture Notes in Computer Science (LNCS), Springer, Vol. 3540, pp. 930 – 939, June 19 – 22, 2005, DOI:10.1007/11499145\_94.
34. A. Biswas, P. Bhowmick, and B. B. Bhattacharya, CONFERM: Connectivity Features with Randomized Masks and Their Applications to Image Indexing, in Proc. of 4<sup>th</sup> Indian Conference on Computer Graphics & Image Processing: ICVGIP'04, Kolkata, India, Allied Publishers Private Limited, *Editors*: B. Chanda, S. Chandran, and L. Davis, pp. 556 – 562, December 16 – 18, 2004.
35. **Prasun Ghosal**, and Tuhin Subhra Das, "FL2STAR: A Novel Topology For On-Chip Rouing in NoC with Fault Tolerance and Deadlock Prevention", Accepted for publication in proceedings of 2013 IEEE International Conference on Electronics, Computing and Communication Technologies (CONNECT), Bangalore, India, Jan 17-19, 2013.
36. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "Honey Bee Based Vehicular Traffic Optimization and Management", In proceedings of Seventh International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2012), Advances in Intelligent Systems and Computing, Volume 202, 2013, pp 455-463.
37. **Prasun Ghosal**, and Arunava Biswas, "Hexagonal Minimum Steiner Tree Construction for Y Architecture: A Case of Non-Manhattan Routing", In proceedings of IEEE Asia-Pacific Conference on Postgraduate Research in Microelectronics & Electronics (PrimeAsia 2012), BITS-Pilani, Hyderabad Campus, India, Dec 05-07, 2012.
38. **Prasun Ghosal**, and Tuhin Subhra Das, "L2STAR: A Star Type Level-2 2D Mesh Architecture for NoC", In proceedings of IEEE Asia-Pacific Conference on Postgraduate Research in Microelectronics & Electronics (PrimeAsia 2012), BITS-Pilani, Hyderabad Campus, India, Dec 05-07, 2012.
39. **Prasun Ghosal**, and Tuhin Subhra Das, "SD2D: A Novel Routing Architecture For Network-on-Chip", Accepted for publication in proceedings of 3rd International Symposium on Electronic System Design (ISED 2012), Kolkata, India, Dec 19-22, 2012.
40. **Prasun Ghosal**, and Tuhin Subhra Das, "Network-on-chip Routing Using Structural Diametrical 2D Mesh Architecture", In proceedings of Third International Conference on Emerging Applications of Information Technology (EAIT 2012), Kolkata, India, Nov 29 - Dec 01, 2012, pp. 471-474.
41. **Prasun Ghosal**, and Tuhin Subhra Das, "*Routing in NoC on Diametrical 2D Mesh Architecture*", In proceedings of 16th International Symposium on VLSI Design and Test (VDAT 2012), July 1-4, 2012, Howrah, India.
42. **Prasun Ghosal**, Arindam Das, and Satrajit Das, "Obstacle Aware RMST Generation Using Non-Manhattan Routing for 3D ICs", In proceedings of The Third International Workshop on VLSI (VLSI 2012), July 13-15, 2012, Chennai, India.
43. **Prasun Ghosal**, Satrajit Das, and Arindam Das, "A Novel Algorithm for Obstacle Aware RMST Construction During Routing in 3D ICs", In proceedings of The Second



- International Conference on Advances in Computing and Information Technology (ACITY 2012), July 13-15, 2012, Chennai, India.
44. **Prasun Ghosal**, Satrajit Das, and Arindam Das, "A New Class of Obstacle Aware Steiner Routing in 3D Integrated Circuits: A Farthest Pair Approach", In proceedings of The Third International Workshop on VLSI (VLSI 2012), July 13-15, 2012, Chennai, India.
  45. **Prasun Ghosal**, and Tuhin Subhra Das, "A Novel Routing Algorithm for On-chip Communication in NoC on Diametrical 2D Mesh Interconnection Architecture", In proceedings of the Second International Conference in Computing and Information Technology (ACITY), July 13-15, 2012, Chennai, India - Volume 3, Springer, pp. 667-676.
  46. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "Speed Optimization in an Unplanned Lane Traffic Using Swarm Intelligence and Population Knowledge Base Oriented Performance Analysis", In proceedings of First International Conference on Soft Computing, Artificial Intelligence and Applications (SCAI) - 2012, May 25-27, Delhi, India.
  47. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "Bio-inspired Computational Optimization of Speed in an Unplanned Traffic and Comparative Analysis Using Population Knowledge Base Factor", In proceedings of Second International Conference on Computer Science, Engineering and Applications (ICCSEA) - 2012, May 25-27, Delhi, India.
  48. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "*Computational Optimization of Speed in an Unplanned Lane Traffic*", In proceedings of IEEE 2nd Annual International Conference on Innovative Techno-Management Solutions for Social Sector (IEMCON 2012), January 17-18, 2012, Kolkata, India, pp. 161-164.
  49. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "*Swarm Intelligence Based Speed Optimization Technique in a Lane Traffic Using Population Knowledge Base*", In proceedings of International Conference on Information Systems Design and Intelligent Applications (INDIA 2012), Springer, January 5-7, 2012, Visakhapatnam, India.
  50. Debjani Basu, Dipak K. Kole, H. Rahaman, "*Implementation of AES Algorithm in UART Module for Secured Data Transfer*", In Proc. of International Conference on Advances in Computing and Communications (ICACC 2012), pp. 142-145, August 2012.
  51. Oyshee Brotee Sahoo, Dipak K. Kole, H. Rahaman, "*An Optimized S-Box for Advanced Encryption Standard (AES) Design*", In Proc. of International Conference on Advances in Computing and Communications (ICACC 2012), pp. 154-157, August 2012.
  52. Poulami Ghosh, Rilok Ghosh, Souptik Sinha, Ujan Mukhopadhyay, Dipak kr. Kole and Aruna Chakraborty, "*A Novel Digital Watermarking Technique for Video Copyright Protection* ", In Proc. of International Conference of Advanced Computer Science & Information Technology (ACSIT-2012), pp. 601-609, October 2012.
  53. Ujan Mukhopadhyay, Souptik Sinha, Poulami Ghosh, Rilok Ghosh, Dipak k. Kole and Aruna Chakraborty, "*Enhancing the Security of Digital Video Watermarking using Watermark Encryption*", In Proc. of International Conference on Conference on Computational Science, Engineering and Information Technology (CCSEIT-2012), pp. 145 -150, October 2012.
  54. Joyati Mondal, Debesh Kumar Das, Dipak K. Kole and Hafizur Rahaman, "*A Design for Testability Technique for Quantum Reversible Circuits*", In Proc. of 10<sup>th</sup> EAST-WEST DESIGN & TEST SYMPOSIUM (EWDTS 2012), pp. 249-252, Ukraine, September 14-17, 2012.
  55. Papiya Manna, Dipak K. Kole, Hafizur Rahaman, Debesh Kumar Das, and Bhargab B. Bhattacharya, "*Reversible Logic Circuits Synthesis using Genetic Algorithm and Particle Swarm Optimization*", International Symposium on Electronic System Design (ISED 2012), IEEE Xplore Digital Library, pp. 246-250, December 19-22, 2012.
  56. Soujanya Chatterjee, Anirban Datta, Soumyajyoti Banerjee, Ashish Singhi, Vivek Kr. Mishra, **Prasun Ghosal**, "Mobile Embedded System for Advanced Weather Forecasting in Rural Area", Accepted for publication in proceedings of Third

- International Conference on Advances in Information Technology and Mobile Communication 2013 (AIM 2013), Bangalore, India, April 26-27, 2013.
57. **Prasun Ghosal**, and Tuhin Subhra Das, "FL2STAR: A Novel Topology For On-Chip Rouing in NoC with Fault Tolerance and Deadlock Prevention", Accepted for publication in proceedings of 2013 IEEE International Conference on Electronics, Computing and Communication Technologies (CONNECT), Bangalore, India, Jan 17-19, 2013.
  58. **Prasun Ghosal**, Arijit Chakraborty, and Sabyasachee Banerjee, "Honey Bee Based Vehicular Traffic Optimization and Management", In proceedings of Seventh International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2012), Advances in Intelligent Systems and Computing, Volume 202, 2013, pp 455-463
  59. Rupam Some, **Indrajit Banerjee**, "PRMN: Predictive Location Based Routing for Mobile Nodes in Wireless Sensor Network" Advances in Computing and Communications (ICACC), Fourth International Conference on, IEEE, 2014/8/27.

#### **Book Chapter:**

1. A. Biswas, S. Pal, P. Bhowmick, and B.B. Bhattacharya, Geometric Analysis and Efficient Indexing of Digital Documents, *Machine Learning Techniques for Adaptive Multimedia Retrieval: Technologies, Applications & Perspectives*, C.-H. Wei (Ed.) (accepted), 2010.
2. **Prasun Ghosal**, Satrajit Das, and Arindam Das, "A Novel Algorithm For Obstacle Aware RMST Construction During Routing in 3D ICs", In Natarajan Meghanathan et al. (Eds.): **Advances in Computing and Information Technology**, Vol. 2, Advances in Intelligent Systems and Computing Series 177, Springer, pp. 649-658.
3. **Prasun Ghosal**, Satrajit Das, and Arindam Das, "A New Class of Obstacle Aware Steiner Routing in 3D Integrated Circuits", In Natarajan Meghanathan et al. (Eds.): **Advances in Computing and Information Technology**, Vol. 3, Advances in Intelligent Systems and Computing Series 178, Springer, pp. 697-706.
4. **Prasun Ghosal**, Arindam Das, and Satrajit Das, "Obstacle Aware RMST Generation Using Non-Manhattan Routing For 3D ICs", In Natarajan Meghanathan et al. (Eds.): **Advances in Computing and Information Technology**, Vol. 3, Advances in Intelligent Systems and Computing Series 178, Springer, pp. 657-666.
5. **Prasun Ghosal**, and Tuhin Subhra Das, "A Novel Routing Algorithm For On-chip Communication in NoC on Diametrical 2D Mesh Interconnection Architecture", In Natarajan Meghanathan et al. (Eds.): **Advances in Computing and Information Technology**, Vol. 3, Advances in Intelligent Systems and Computing Series 178, Springer, pp. 667-676.
6. **Prasun Ghosal**, and Tuhin Subhra Das, "Routing in NoC on Diametrical 2D Mesh Architecture", In H. Rahaman et al. (Eds.): **VDAT 2012, LNCS 7373**, pp. 381--382. Springer, Heidelberg (2012).
7. **Prasun Ghosal**, Hafizur Rahaman, Satrajit Das, Arindam Das, and Parthasarathi Dasgupta, "Obstacle Aware Routing in 3D Integrated Circuits", In P.S. Thilagam et al. (Eds.): **ADCONS 2011, LNCS 7135**, pp. 450--459, 2012. Springer-Verlag Berlin Heidelberg 2012.
8. **Prasun Ghosal**, Tuhin Subhra Das, "Routing in Multi-core NoCs", In **Multicore Technology: Architecture, Reconfiguration and Modeling**, CRC Press, Editors: Muhammad Yasir Qadri & Steve J Sangwine. [In press]

9. S Datta, I Banerjee, T Samanta, "Mobile Sink Management for Nonuniformly Distributed Sensor Node Coverage Using a Game Theoretic Approach", Recent Advances in Intelligent Informatics, Springer 2014 , pp: 311-319 |
10. I Banerjee, A Datta, S Pal, S Chatterjee, T Samanta, "A Novel Fault Detection and Replacement Scheme in WSN", Recent Advances in Intelligent Informatics, Springer 2014 pp: 303-310.
11. Indrajit Banerjee, Anirban Datta, Sonalisa Pal, Soujanya Chatterjee, Tuhina Samanta, "A Novel Fault Detection and Replacement Scheme in WSN", Recent Advances in Intelligent Informatics Advances in Intelligent Systems and Computing Volume 235, 2014, pp 303-310
12. Indrajit Banerjee, Prasenjit Chanak, Tuhina Samanta, Hafijur Rahaman "EFDR: Effective Fault Detection and Routing Scheme for Wireless Sensor Network", International Journal of Computers & Electrical Engineering, Elsevier (In Press), 2013.

### **Research facilities:**

The PDSIT laboratory is equipped with 50 No of high configuration Desktop Computers.

- a) All computers are connected to Internet with the 1 Gbps. LAN Support.
- b) Department is equipped with WiFi connection.
- c) International Journal from IEEE, Elsevier, etc. is available on line.
- d) Laboratory is open from 8.00 AM to 9.00 PM.
- e) PDSIT has a Departmental Library.
- f) Computing facilities in Promoda Lodh Advanced Information Technology laboratory:

Hardware and Software:

IBM X226 Server -- 2Nos.

IBM Websphere Everyplace Access Server and client.

#### **Wireless Equipment:**

|   |
|---|
| IBM Think Pad W/High rate Wireless LAN                      |
| Linkys Network Adapter                                      |
| IBM high rate Wireless                                      |
| Palm M505   |
| Palm Palm Portable , Palm Serial Cable, Palm Hatsync Cradle |
| Palm Flash Memory Pre - Installed on Palm                   |
| Palm Handheld Stylus Pack of 3,XIRCOM Wireless LAN Module   |
| i PACK- 2NOS.   |

Special purpose facilities available in the school:

- ☐ Laser Printers connected to Network.
- ☐ Scanner is available.
- ☐ Web Camera (for project purpose)
- ☐ Students have the scope to modify, configure or administrate any Server or

Workstation

### Support staff position

(i) Sanctioned technical post : 3

(ii) Technical staff profile ( in the following table) :

(iii) Administrative Staff :

| Staff Name          | Designation         | Highest Qualification                                   | Contact No | E-mail Id  |
|---------------------|---------------------|---|------------|--|
| <b>Office Staff</b> |                     |   |            |  |
| Goutam Bandopadhyay | Accountant          | B.Com (Distinction)<br>M.Com, ICWAI<br>(Inter)<br>PGDCA | 9433134162 | <a href="mailto:gb8206@gmail.com">gb8206@gmail.com</a>                 |
| Susanta Sarma       | Office Assistant    | B.Sc.   | 9433609953 | <a href="mailto:sarma.susanta15@yahoo.in">sarma.susanta15@yahoo.in</a> |
| Amal Das            | Technical Assistant | B.Tech (Computer Science)                               | 9836787069 | <a href="mailto:amaldas.cs@gmail.com">amaldas.cs@gmail.com</a>         |
| Rabindra Nath Das   | Group D             | Class - VIII  | 9836662273 |  |

**No of Publications : ( This year only )**

**Journal : 36 Conference : 52**



***Dr. M.N. Dastur School of  
Materials Science and Engineering***



## **About the department**

Dr. M. N. Dastur School of Materials Science and Engineering started functioning since 2001 as a multidisciplinary educational and research centre with a vision to create a vibrant, supportive community of materials scientists and engineers committed to expand fundamental understanding of materials, develop advanced technologies, and provide leadership through education and innovative research geared to meet the current and future needs of society. The School is an integral part of Indian Institute of Engineering Science and Technology, Shibpur and aims at providing an ideal environment for interdisciplinary teaching and research.

Since its inception the School has embarked on several programmes to facilitate fundamental developments in the physics and chemistry of materials alongside applications in manufacturing processes and engineering design. Over these years, its central function has been imparting education to postgraduate students by providing them with the opportunity to conduct independent and creative research at the forefront of materials science and engineering. The School offers a full time M.Tech. programme on Materials Science and Technology, with specialization on Materials Design and Application and has a concrete plan for introducing a four year post-B.Sc. integrated M.Tech. programme on Materials Science.

The School started its modest journey in 2001 with extremely limited facilities which included a furnace and few computers. Ever since then, the faculty members, research scholars and the staff members of the School have worked relentlessly to develop new facilities and infrastructure through sponsored projects and with the assistance of the erstwhile University. In the brief span of 12 years we have been able to develop major experimental facilities for synthesis/fabrication and characterization of materials, including a high resolution transmission electron microscope. Till date 21 scholars have been awarded their doctoral degree and more that seventy scholars have received their M.Tech degree from the School.

The School has several sponsored projects funded by different funding organizations like DST, MoS, UGC, etc. and have been able to develop collaborations with some leading material scientists and their groups both at the national as well as at the international level. Additionally, the Schools activities are closely linked with leading industries like Tata Steel and M. N. Dastur Company. Recently the School has signed a memorandum of agreement with M. N. Dastur Company, who has agreed to provide generous support for up gradation of the School.



What started as an insignificant centre with a furnace, dilapidated furniture and few computers in 2001 has now emerged as a centre that is starting to make modest footprints in the international materials research community.

### Academic Programmes

**Undergraduate Level:** Not Application

### Postgraduate Level

**i) Degree Offered:** Master of Technology in Materials Science and Technology

**ii) Sanctioned Students' intake:** 18 nos. students per year (AICTE approved)

**iii) Additional intake through other programmes (i.e. Q.I.P).** Nil

**iv) Specialisation in** (a) Materials Design & Application

### Doctoral Level

**i) Degree Offered:** Engineering

**No of candidates enrolled: 10      Registered: 08      Awarded: 08**

**Submitted: 03**

### Faculty position:

**Sanction faculty post (permanent): 04, Vacant post: 03**

**Endowment Faculty: 01, Vacant: 0**

**Contractual Faculty: 01, Vacant: 0**

### Faculty profile

| Name                    | Designation                             | Highest Qualification                          | Specialisation/Research Area   | Contact no E-mail  |
|-------------------------|---|--|--|--|
| Dr. S. Chatterjee       | Director                                | Ph.D.<br>(Engineering),<br>PRS (in<br>Science) | Phase Transformation,<br>HSLA Steel, High<br>Strength Steel,<br>Diffusion Bonding of<br>Similar and Dissimilar<br>Materials, Friction Stir<br>Welding of Similar and<br>Dissimilar Materials | schatterjee46@yahoo.com<br>directorsmse@gmail.com                                  |
| Dr. N. R. Bandyopadhyay | Professor                               | Ph.D.<br>(Engineering)                         | Physical Metallurgy of<br>Steel, Materials<br>Characterization, Nano-<br>materials, Energy<br>Materials  | nrb@matsc.becs.ac.in<br><a href="mailto:nrbbesus@gmail.com">nrbbesus@gmail.com</a> |
| Dr. Mallar Ray          | Assistant<br>Professor<br>(Endowment)   | Ph.D.<br>(Engineering)                         | Experimental and<br>theoretical investigations<br>on semiconductor and<br>hybrid nanostructures.   | mray@matsc.becs.ac.in  |
| Dr. Arijit Sinha        | Assistant<br>Professor<br>(Contractual) | Ph.D.<br>(Engineering)                         | Nanomaterials<br>Characterization,<br>Composite Materials,<br>Shape Memory alloys  | arijit@matsc.becs.ac.in<br>sinharijit@gmail.com                                    |
| Dr. T.K. Roy            | Adjunct<br>Professor                    | Ph.D.<br>(Engineering)                         | Making, shaping and<br>treating of steel and<br>conceptual plan Project<br>monitoring  | tkroy.tatachair@gmail.com  |
| Prof. R. K. Ray         | Adjunct<br>Professor                    | Ph.D.<br>(Engineering)                         | Physical Metallurgy and<br>Materials Engineering   | rkray@iitk.ac.in   |

## **Awards and Laurels:**

### **S. Chatterjee, Director**

- Indian Institute of Metals (IIM) **Distinguished Educator Award – 2013**
- Visited Ecole Polytechnique, Palaiseau, Paristech, **France**, Tata Steel, **The Netherland** and University Aachen, **Germany** for pursuing collaborative research during **June 21 to July 05, 2013**.

### **N. R. Bandyopadhyay, Professor**

- **Technology Excellence Award 2014** by Indian Technology Congress 2014.
- **Fellow**, West Bengal Academy of Science and Technology (**WAST**)

Prof. N. R. Bandyopadhyay holds the following positions:

- **Chairman, Committee for Advancement of Technology and Engineering ( CATE) of The Institution of Engineers (I) (IEI)**
- **Vice-President, Materials Research Society of India (MRSI)**
- **Editor –in Chief, IEI- Springer Series D Journal for Metallurgical & Materials Engineering.**
- **Consulting Editor, Technorama, a flagship Journal of IEI for Professional Engineers and Decision Makers.**

### **Arijit Sinha, Assistant Professor**

- Recipient of **IEI Young Engineers Award 2014-2015**, The Institution of Engineers (India).

### **PhD Students:**

### **Mr. Tuhin Shuvra Basu, CSIR-SRF, MNDSMSE**

- Presentation on Electrical and Thermal Property of Silicon Metal Hybrid System in Symposium F at EMRS Spring Meeting held in Strasbourg, France during May 27 to May 31, 2013 (Sponsored by DST, GoI under International Travel Support Scheme).
- Recipient of Best Paper Award entitled Enhancement of Open Circuit Voltage and Short Circuit Current of Silicon Solar Cell by incorporation of Silicon Nano-crystal by IEI (India)

**Mr. Santanu Puttanayak, Ph.D. Scholar**

- Recipient of **CSIR Fellowship Award 2014.**


**Mr. Soumen Chatterjee, Ph.D. Scholar**

- ERASMUS MUNDUS Action 2 (EMA2) exchange student 2014 at Ghent University, Belgium


**Research area**

- Nano-Semiconductor materials
- Advanced steel
- Composite materials
- Energy materials
- Smart materials
- Biomaterials
- Computational materials science
- High strength non-ferrous metals


**Research facilities:**




| <i>Name of Equipment</i>                       | <i>Few words</i>   | <i>Pictures</i>  |
|--|--|--|
| Olympus Optical Microscope with Image Analyzer | Basic Instrument for materials characterization. Microstructure, which governs the materials (Metal, Ceramics, Polymer or Composites) property, can be examined. |  |
| Leco Micro-Vickers Testing Machine             | Preliminary determination of mechanical properties of all kind of materials through measuring the hardness of the sample.  |  |



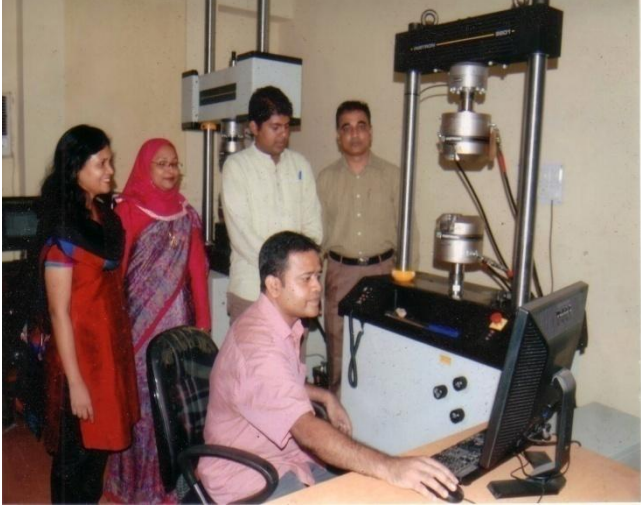
**Left Hand Side:** Olympus Optical Microscope with Image Analyzer , **Right Hand Side:** Leco Micro-Vickers Testing Machine

|                    |                  |   |   |
|--------------------|------------------|---|---|
| Ducom Wear Machine | Fretting Testing | Abrasive or wear resistance property under service condition is examined in fine details. |  |
|--------------------|------------------|---|---|


*and under Central Materials Research Facility*

|                               |  |  |
|-------------------------------|--|--|
| Veeco Atomic Force Microscope | <p>Surface Property determination through scanning probe microscopy / atomic force microscopy.</p> <p>Attachments for electrical and magnetic property characterization is available with the instrument</p> |  |
|-------------------------------|--|--|

|  |   |  |
|--|---|--|
| CSM Nano-indentor  | Nano scale indentation for mechanical property characterization.  |    |
| Hitachi Scanning Electron Microscope with Horiba EDS System and EBSP | Finer Microstructural details can be examined by Scanning Electron microscopy. Local chemical constituents are measured through Energy Dispersive X-ray (EDS) Spectroscopy. The Electron Back Scattered Diffraction Pattern (EBSP) can be examined. |   |
| Leco Glow Discharge Spectroscope                                     | This instrument measures the chemical composition of metals and alloys by optical emission through Spectroscopic analyses.  |  |

|  |  |  |
|--|--|--|
| <p>Photoluminescence (PL) System</p>   | <p>Optical Characterization Instrument</p>   |  <p>A laboratory setup for photoluminescence (PL) characterization. It features a computer workstation on the left and a specialized instrument on a wooden table. The instrument includes a light source, a sample stage, and a detector system. A blackboard and a window are visible in the background.</p>                                     |
| <p>FEI Tecnai G2 20 S-TWIN Transmission Electron Microscope (TEM) 200 KV with EDX</p>            | <p>Very high resolution microstructural characterisation, electron diffraction and energy dispersive x-ray analytical facility for micro-chemical analysis</p> |  <p>A group of people, including a man in a white shirt and a woman in a red headscarf, are gathered around a large FEI Tecnai G2 20 S-TWIN Transmission Electron Microscope (TEM). The man is operating the microscope, while the others observe. The microscope is a tall, vertical unit with a large viewing window and a control console.</p> |
| <p>Instron 8801 Axial Servohydraulic Dynamic Testing System <math>\pm 100</math> kN capacity</p> | <p>For tensile compression and other mechanical testing for determining YS, UTS etc.</p>   |  <p>A group of people, including a man in a pink shirt and a woman in a red headscarf, are gathered around an Instron 8801 Axial Servohydraulic Dynamic Testing System. The man is operating the system, while the others observe. The system is a large, vertical machine with a sample stage and a control console.</p>                        |



|  |   |   |
|--|---|---|
| Instron 8862<br>Axial<br>Servoelectric<br>Dynamic Testing<br>System $\pm 250$ kN<br>capacity | For tensile<br>compression and<br>other mechanical<br>testing for<br>determining YS,<br>UTS etc with higher<br>capacity |  |
|--|---|---|

**Name of laboratories:**

1. **Nano Semiconductor Lab:**
2. **Materials Characterisation Lab:**
3. **Computational Materials Science Lab.**
4. **Tribology Lab:** Fretting Wear Tester (Ducom)
5. **Low-dimensional Advanced Materials Synthesis Lab.**
6. **Student Computer Lab.**

**Support staff position:**

(a) (i) **Sanctioned technical post: 01 (permanent)**

(b) (ii) **Technical staff profile**

| Name               | Designation                      | Highest Qualification | Contact no         | E-mail                  |
|--------------------|----------------------------------|-----------------------|--------------------|-------------------------|
| Dr. Subhas Ganguly | Technical Assistant              | Ph.D. (Engineering)   | 2668-8140 (Office) | subhas@matsc.becs.ac.in |
| Dr. Malay Kundu    | Scientific Officer (Contractual) | Ph.D. (Engineering)   | 2668-8140 (Office) | mkundu@matsc.becs.ac.in |

**Administrative Staff & Lab. Staff : 4 nos. (Contractual)**

| Name                  | Designation          | Highest Qualification   | Contact no | E-mail                  |
|-----------------------|----------------------|---|------------|-------------------------|
| Sanjay Sarkar         | Office Assistant     | B.A. History Hons<br>(2 <sup>nd</sup> year completed<br>3 <sup>rd</sup> year ongoing) | 9830450599 | ss@matsc.becs.ac.in     |
| Pradip Kumar Majumder | Office Peon          | Secondary   | 8420281986 | -                       |
| Sudip Bhattacharjee   | Laboratory Attendant | B.Com   | 9331177191 | sudipannand@gmail.com   |
| Kumar Nayak           | Laboratory Attendant | B.Com   |            | kumar.nayak55@gmail.com |

**Sponsored Research (during 2013-2014):**

| Sl. No. | Title of Research Project   | Sponsoring Agency   | Year of Start and duration |
|---------|---|---|----------------------------|
| 01.     | Development of high-strength low-carbon multiphase steels (YS~1000 MPa, UTS~1300 MPa and Elongation 40-50%)<br><b>Value : Rs 628.00 lakhs</b>                               | Ministry of Steel , Govt. of India                          | Three (3) years            |
| 02.     | Studies on Mechanical Property Evaluation of Coatings by Instrumented Indentation Technique<br><b>Value : Rs 7.70 lakhs</b>   | Gas Turbine Research Establishment (GTRE), Bangalore , DRDO | 18 <sup>th</sup> Months    |
| 03.     | Fabrication of cost effective oxygen reduction catalyst for low temperature fuel cells<br><b>Value : Rs 1.50 lakh</b>   | The Institution of Engineers (India)                        | 1 (1) year                 |
| 04.     | Development of a Jute Based Bi-Composite Utilizing Polyolefin and/or Polylactic Acid-its Characterisation and Industrial Process Development<br><b>Value : Rs 1.50 lakh</b> | The Institution of Engineers (India)                        | 1 (1) year                 |
| 05.     | Conducting Polymer Nanowire based electrical biosensor for bacteria detection<br><b>Value : Rs 1.00 lakh</b>  | The Institution of Engineers (India)                        | 1 (1) year                 |
| 06.     | Synthesis of mixed metal oxides by high energy ball milling for their application as photocatalyst for waste-water treatment<br><b>Value : Rs 1.50 lakh</b>                 | The Institution of Engineers (India)                        | 1 (1) year                 |



**No. of Publications (during 2013-2014)**

(Journal only)

| <b>Sl. No.</b> | <b>Title of Research paper</b>  | <b>Title of the Journal</b>                   | <b>Year</b> | <b>Vol./ issue No</b> | <b>Page Nos.</b> |
|----------------|---|---|-------------|-----------------------|------------------|
| 01.            | Tunable charge transport through n-ZnO nanorods on Au coated macroporous p-Si   | Journal of Materials Chemistry C              | 2014        | In press              |                  |
| 02.            | Sintering and Electrical Properties of Ce <sub>0.75</sub> Sm <sub>0.2</sub> Li <sub>0.05</sub> O <sub>1.95</sub>  | International Journal of Hydrogen Energy      | 2014        | I                     | 5                |
| 03.            | Highly Lattice-mismatched Semiconductor-Metal Hybrid Nanostructures: Gold Nanoparticle Encapsulated Luminescent Silicon Quantum Dots  | NANOSCALE                                     | 2014        | 6                     | 2201-2210        |
| 04.            | Indentation and scratch behavior of functionalized MWCNT–PMMA composites at the micro/nanoscale   | Polymer Composites                            | 2014        | 35                    | 948              |
| 05.            | Tribological Studies of Microplasma Sprayed Hydroxyapatite Coating at Low Load  | Materials Technology: Advanced Biomaterials   | 2014        | 29                    | B35              |
| 06.            | Collective charge transport in semiconductor-metal hybrid nanocomposite   | Applied Physics Letters                       | 2013        | 102                   | 053107-053107-5  |
| 07.            | Sintering and densification behaviours of pure and alkaline earth (Ba <sup>+2</sup> , Sr <sup>+2</sup> and Ca <sup>+2</sup> ) substituted La <sup>2</sup> Mo <sup>2</sup> O <sup>9</sup>  | Journal of the European Ceramic Society       | 2013        | 33                    | 79               |
| 08.            | Performance enhancement of crystalline silicon solar cell by coating with luminescent silicon nanostructures  | Journal of Electronic Materials               | 2013        | 3                     |                  |
| 09.            | Study of Structure – Properties (Corrosion and Mechanical) of TRIP-Assisted Steels by Nondestructive Testing  | I-Manager's Journal on Mechanical Engineering | 2013        | 3                     | 37               |
| 10.            | Interfacial reactions and strength properties in dissimilar titanium alloy/Ni alloy / microduplex stainless steel diffusion bonded joints   | Materials Science and Engineering A           | 2013        | 560                   | 288              |
| 11.            | Effect of microstructure and reaction products on the strength properties of micro-duplex stainless steel   Ni alloy interlayer   Ti6Al4V diffusion bonded joints, Volume 560, 10 January | Materials Science and Engineering A           | 2013        | -                     | -                |

|     |   |   |      |             |      |
|-----|---|---|------|-------------|------|
|     | 2013, Pages 288-295).   |   |      |             |      |
| 12. | Photoluminescence From Oxidized Macroporous Silicon: Nanoripples and Strained Silicon Nanostructures                  | IEEE Transactions on Device and Materials Reliability | 2013 | 1           | -    |
| 13. | Structure-Properties Relationship of TRIP-assisted Steels by Non-destructive Testing Method                           | Chemical and Materials Engineering                    | 2013 | 1           | 18   |
| 14. | Development and Characterization of Al <sub>2</sub> O <sub>3</sub> reinforced Al/Mg/Cu/Ti matrix composite            | Journal of Materials Science and Technology           | 2013 | 29          | 1085 |
| 15. | Effect of Space Charge Density and High Voltage Breakdown of Surface Modified Alumina Reinforced Epoxy Composites     | Transactions on Electrical and Electronic Materials   | 2013 | 14          | 121  |
| 16. | Microstructure and mechanical properties of Al/Fe-aluminide in-situ composite prepared by reactive stir casting route | Materials Science and Engineering A                   | 2013 | 578         | 6    |
| 17. | Enhanced shape recovery in cryogenically treated martensitic TiNi alloys  | Materials Science and Engineering A                   | 2013 | 580         | 273  |
| 18. | A Study on nanoindentation and tribological behavior of multifunctional ZnO/PMMA nanocomposite                        | Materials Letters                                     | 2013 | 93          | 137  |
| 19. | Mechanical properties of Ti-(~49 at. %) Ni shape memory alloy: Part II Effect of ageing treatment                     | Materials Science and Engineering A                   | 2013 | 561         | 338  |
| 20. | Mechanical properties of Ti-(~49 at. %) Ni shape memory alloy: Part I Effect of cold deformation                      | Materials Science and Engineering A                   | 2013 | 561         | 344  |
| 21. | Optimization of mechanical property and shape recovery behavior of Ti-(~49 at. %) Ni alloy using ANN and GA           | Materials and Design                                  | 2013 | 46          | 227  |
| 22. | Understanding the shape memory behavior in Ti-(~49at.%) Ni alloy by nanoindentation measurement                       | Metallurgical and Materials Transactions A            | 2013 | 44A         | 1722 |
| 23. | Variation of tensile behavior of interstitial free steel rolled at cryogenic and room temperature                     | Journal of the Institution of Engineers (India)       | 2013 | Series D 93 | 97   |
| 24. | On the plasticity of interstitial free steel subjected to cryogenic rolling followed by annealing                     | Materials and Manufacturing Processes                 | 2013 | 28          | 242  |

### Technology Developed/Innovations.

- Solar cell coated with Silicon nano-crystals which is fabricated at Nano-semiconductor Laboratory at MNDSMSE shows considerable increase in open-circuit voltage and short-circuit current which can potentially increase overall efficiency of coated solar cells

### Foreign visits and Invited Lectures:

- [1] **N. R. Bandyopadhyay**, "Transfer of Technologies from R&D Institutions to Industries: Opportunities and Challenges", *Indian Technology Congress* at Bangalore, August 22, 2014.
- [2] **N. R. Bandyopadhyay**, "Higher Engineering Education and Sustainable Development: Need for a Paradigm Shift", **Narula Institute of Technology**, Kolkata, January 7, 2014.
- [3] **M. Ray**, "Unusual Optical and Transport Properties of Semiconductor and Semiconductor-Metal Nanostructures" *National Seminar on Advanced Functional Materials (NSAFM-2013)*, CSIR-CMERI, Durgapur, January 24, 2013.
- [4] **M. Ray**, "Extraordinary Properties of Silicon based Hybrid Nanostructures" *National Conference on Nanoscience and Nanotechnology (NS&NT-2014)*, University of Calcutta, September, 18-19, 2014.
- [5] **Arijit Sinha**, "Nanomechanical Characterization of Martensite in Cryogenically Deformed Ti-(~49 at.%) Ni Alloy", 27<sup>th</sup> National Convention of Metallurgical and Materials Engineering & National Seminar on Multifunctional and Adaptive Materials, 6-7<sup>th</sup> February, 2014, organized by The Institution of Engineers (India), Karnataka State Centre.
- [6] **Arijit Sinha**, "Nanomechanical Behaviour of Martensite in Cryogenically Rolled Ti-(~49 at.%) Ni Alloy", seminar on "Microstructure of Materials" and METALLUM 2014, 12-14<sup>th</sup> March, 2014 organized by Department of Metallurgy and Materials Engineering, IEST, Shibpur.

### Others

Signing of Memorandum of Agreement (MoA) between **MNDSMSE, BESU, Shibpur** and **M.N.Dastur & Co (P) Ltd, Kolkata** on 10.07.2013 for furthering the activities of the scho

*School of  
Management Sciences*



### **About the department**

School of Management Sciences has emerged as an Institution of excellence in all facets of management education with highly specialized, sophisticated and 21<sup>st</sup> Century oriented courses and curriculum. The goal of SOMS is to achieve professional growth through holistic management education to shape future leaders for the corporate through intermingling of functional knowledge of Marketing, Finance, Operations, Human Resource & IT Management.

The MBA programme is designed to deliver the latest business education. The emphasis of the programme is on an integrated understanding of the totality of business, its philosophy and socio-economic inter-relationship. The programme is specially designed to develop and enhance the basic managerial skills and abilities of students and to equip them with tools & techniques of modern management for better decision-making.

Different teaching methods like case studies, simulation games, group discussions, group seminars, scenario building and project work are used to make the teaching-learning process interesting. Students are encouraged to analyze, innovate and prepare themselves for professional challenges of the industry. The two years' programme leading to the Masters in Business Administration

### **Academic Programmes:**

#### **Post Graduate Level**

Degree offered – 2 year Full Time MBA

Sanctioned students' intake 60

Additional intake through other programmes (i.e. QIP) NA

Specialisations in- Human Resources Management ,Financial Management, Information Technology Management,Marketing Management, Operations Management

#### **Doctoral & Post Doctoral Research Programme**

Degree offered : PhD ( Management Science ) :

No of Candidates enrolled : 3

No. of Candidates registered:1

No. of Candidates awarded:3

**Faculty Position:**

Sanctioned faculty post ..... Vacant Post .....

(a) Faculty profile (in the following table )

| Name                      | Designation                     | Highest Qualification   | Specialisation / Research Area                          | Contact No.<br>E - mail                                 |
|---------------------------|---------------------------------|-------------------------|---|---|
| Dr. Prabir Kumar Paul     | Director, SOMS                  | Doctorate of Philosophy | GIS, RS & MIS   | 033 26688355<br>Prabirpaul59@gmail.com                  |
| Poulomi Mukherjee Mondal  | Assistant Professor On Contract | Ph.D. (Engg)            | Operations Management/<br>Management Information System | 26684561 extn: 435<br>poulomi.mukherjeemondal@gmail.com |
| Shyamal Kumar Chakraborty |                                 | ME, PGDB M              | Operations Management/                                  | 26684561 extn:433                                       |
| Sumanta Deb               | Assistant Professor On Contract | <b>MBA</b>              | Marketing Management                                    | 26684561 extn:436<br>Sumanta04@gmail.com                |
| Surabhi Sinha             | Assistant Professor On Contract | <b>MBA</b>              | Human Resource Management                               | 26684561 extn:438<br>surabhisinha@yahoo.com             |
| Monalika Dey              | Assistant Professor On Contract | <b>MBA</b>              | Human Resource Management                               | 26684561 extn:438<br>Monalika.dey@gmail.com             |

**Research area (only mention broad titles without description in detail) :**

Management Information System, Operations Management, Human Resource Management, Marketing Management

**Research facilities: (name specific equipment / picture, infrastructure etc)**

Toshiba Laptop, Internet Connection, EBESCO and JGATE, SPSS and Prowess

**Name of the laboratories :**

Computer Laboratory at U821

**Support staff position:**

(a) (i) Sanctioned technical post .....

(ii) Technical staff profile (in the following table)

| Name                   | Designation         | Highest Qualification | Contact No.           | E- mail                     |
|------------------------|---------------------|-----------------------|-----------------------|-----------------------------|
| Goutam Sarkar          | Office Assistant    | B. Com                | 26684561<br>Extn: 439 | monti.papu@gmail.com        |
| Mousumi Shaw (Das)     | Assistant Librarian | M. Sc.,<br>BLIS       | 26684561<br>Extn: 442 | shaw.mousumi@yahoo.in       |
| Dipsikha Chandra (Pal) | Computer Assistant  | M. Sc.,               | 26684561<br>Extn: 443 | dipsikha84@gmail.com        |
| Pranab Satpathi        | Office Peon         | H. S.                 | 26684561<br>Extn: 439 | pranab_satpathi@yahoo.co.in |
| Sukanta Guha           | Office Peon         | H. S.                 | 26684561<br>Extn: 439 |                             |

**Industry – Institute Interaction**



**Details of publications of each faculty member (2013 – 14)**

**Dr. Prabir Kumar Paul**

**Journal Publication**

**Conference Publication**

**Dr. Poulomi Mukherjee Mondal**

**Journal Publication...**

Conference : Proceedings of Paper titled “ **Managing Reliability in Printing Industries : Role of Information System**” at Eleventh AIMS International Conference on Management held at IMT Gahaziabad, December 21-24, 2013

Books / Monographs : “ **Managing Reliability in Printing Industries : Role of Information System**” in ‘Managing Organizations in Digital Era-Selected papers from proceedings of Eleventh AIMS International Conference on Management. PP 267-275, ISBN :978-81-924713-72

**Surabhi Sinha**

**Journal Publication....**

**Enhancing Knowledge Sharing in Universities through SECI Model: A Conceptual Approach NSHM Journal of Management Research and Applications, Vol. 3, No. 1, Dec’ 13, pp- 29-38 (ISSN No. 0975-2501)**

**Sumanta Deb**

**Journal Publications:**

**The Spatial Economic Rationale for Optimum Area and Positioning of Spaces in Planned Shopping Centres; Pacific Business Review International, Vol- 5, Issue 10, April 2013, pp-95-103 (ISN No. 0974-430X)**

**Space Morphological Analysis as a tool for Managerial Decision Making: Presidency Journal of Management Thought & Research, Vol. III, No.2, July-December 2013, pp-66-77(ISSN No. 2229-5275)**

**Indian Real Estate Market:Issues and Challenges: Perspectives on Management, Vol. 5, No. 1 & 2 July’ 13, pp- 3-17(ISSN No. 0974-7095)**

**Application of Space Syntax in understanding the Economic Rationale for Rent of Non-Anchor Shops in Shopping Centres: NSHM Journal of Management Research and Applications, Vol. 3, No. 1, Dec’ 13, pp- 1-17(ISSN No. 0975-2501)**

**Importance of Spatial Arrangement of Offices in an Era of Knowledge Sharing: JMDR's Journal of Management Development and Research, Vol. 1, No. 1, May, 2014, pp- 70-91(ISSN No. 2349-0802)**

**A Framework for Positioning of Shops in Planned Shopping Centres: National Research Journal of Sales and Marketing Management, Vol. 1, Issue 1, 2014, pp- 1-13 (ISSN No. 2349-512X)**

**Social Logic of Office Planning: JIS Management Vista, Vol VII, No.1, Jan- Jun 2014,pp- 100-115 (ISSN No. 0974-0872)**

**'The Spatial-Economic Rationale for Rent and Positioning of Shops in Shopping Centers'** accepted for publication in ASBM Journal of Management

**International and National Conferences:**

**Social Logic of Spatial Arrangement of Office: in an Era of Knowledge Sharing**, paper presented at International HR Conference, HR NEXT- Focus, Engage, Align, held at the Indian Institute of Social Welfare and Business Management, Kolkata, February 27<sup>th</sup> and 28<sup>th</sup>, 2013

**Space Morphological Analysis as a Strategic Decision Making Tool**, paper presented at 20<sup>th</sup> West Bengal State Science and Technology Congress-2013, held at the Bengal Engineering and Science University, Shibpur, Howrah, February 28-March 2, 2013

**Spatial influence on Consumer Behaviour: A study in Shopping Malls to Integrate Retail and Design Strategies**, paper presented at CERE 2013, IIM Indore, 9<sup>th</sup>-12<sup>th</sup> May, 2013

**Monalika Dey**

**Journal Publications.**

**Microfinance Institution: An Avenue to Women Entrepreneurship: NSHM Journal of Management Research and Applications, Vol. 4, No. 1, June14, pp- 20-31 (ISSN No. 0975-2501)**

**Introducing Total QualityManagement Organisational Culture in Microfinance Institution**

Special Issue of ASBM Journal of Management Vol.1 No.1,Jan 13,pp-88-102 (ISSN No.0943-2651)

**Total Quality Management and Microfinance Institution: JIS Management Vista, Vol V, No.1, Jan- Jun 2013,pp- 78-85 (ISSN No. 0974-0872)**

**International and National Conferences:**

Paper Presented at International Management Convention at ASBM Bhubaneswar in January 2013,Paper title Assessing Total Quality Management Organization Culture in Microfinance of West Bengal

### **Seminar / Workshops / Conferences / Training programme organized by the department (2013 - 14)**

On 25th September 2013 a seminar was organized on the title 'Strategic area of interest of corporate at this time'. Mr. Rahul Bose, Manager IBM India Pvt. Ltd was the key speaker.

On 26th October 2013, Mr. Soumen Mukhoppadhyay AVP, HSBC Security Services and Mrs. Madhura Mukherjee AVP, HSBC Ltd visited SOMS to chair a seminar on the title 'Issues on Contemporary Banking'

An International Workshop on Case Study Method of Teaching Learning in Management Education" was conducted by Dr. Jayanti Bandopadhyay, Sr. Faculty, Bertolon School of Business, Salem State University, Massachusetts, USA and Sri Gautam Bandopadhyay, Consultant and Retd. Regional Head, Siemens Corporation on 10<sup>th</sup> Jan 2014.

Seminar on "Importance of stock market for students" on 29<sup>th</sup> Jan 2014 by Stockmind, ICICI Securities Ltd.

Seminar on "Changing dimensions of modern business management" by Prof. Ratan Khashnanis, Prof. Arun Kumar Basu, Prof. Sitanath Majumdar, Prof. Sunil Gandhi on 18<sup>th</sup> Feb 2014.

### **Technology Developed / Innovations**

### **Advancements under TEQIP – Phase II**

#### **Foreign visits and Invited Lectures:**

Monalika Dey, Assistant Professor was invited to deliver a presentation at the Entrepreneur Awareness Camp at Bharat Technology Uluberia on 6<sup>th</sup> and 8<sup>th</sup> August 2014

Monalika Dey, Assistant Professor was invited to deliver a presentation at the Entrepreneur Awareness Camp at Calcutta Institute of Technology Howrah on 20<sup>th</sup> and 22<sup>nd</sup> November 2014

P.K. Paul visited ITC, Netherlands for one month duration.

## **Training and Placement**

**2013- Total pass out 38**

**Placement on Campus: 6**

**Placement off Campus: 32**

**2014 – Total Pass out 30**

**Placement on Campus: 10**

**Placement off Campus: 20**

## **Extension Activities and Societal outreach**

### **New Academic / Research Initiatives**

#### **Academic Collaboration**

Publication of The Vision –Journal of Management Science from School of Management (National Journal with ISSN Number).

#### **Industrial Collaboration**



## A collage of ten images showing various robotics projects and components. The images include: a robotic arm with a gripper; a blimp; a laptop displaying a software interface; a robot; a person working on a robot; a person working on a robot; a person working on a robot; a person working on a robot; a person working on a robot; and a person working on a robot.



## **About the School**

The beginning of this century is marked with multi disciplinary technological advancement which has not only revolutionized Indian and global industrial market but also has put an impact on engineering education system. IEST Shibpur responded to the changed technological scenario by introducing a new specialized engineering post graduate degree course in Mechatronics under the School of Mechatronics & Robotics. The course is unique with respect to similar degree programs offered by other Indian Universities and is framed accordingly to educate graduate engineers to become experts in the multidisciplinary area involving mechanical engineering, electrical engineering, electronics along with computer software. The School of Mechatronics & Robotics was established as an interdisciplinary school in 2007. The School undertakes different research and development activities in the areas of cutting edge technology. The Post Graduate course (M. Tech.) in Mechatronics has been introduced in collaboration with three reputed National level laboratories under Council of Scientific and Industrial Research (CSIR), New Delhi, namely, Central Electronics Engineering Research Institute (CEERI), Pilani, Central Scientific Instrument Organization (CSIO), Chandigarh and Central Mechanical Engineering Research Institute (CMERI), Durgapur. This is a unique and new initiative for generating trained manpower in the futuristic multi-disciplinary area of mechatronics. A memorandum of understanding (MOU) was signed between IEST (formerly BESU) and CSIR for this purpose in February, 2007. The program is of two years duration and is conducted by the participating institutes by utilizing their expertise and facilities available. The programme is structured around the core competence of all the four constituent institutions. The faculty members have been drawn from all the four places based on the expertise of scientists and academicians. While the course is conducted at IEST Shibpur, CEERI, CSIO and CMERI, the academic degree (M.Tech) is awarded to students by IEST on successful completion of the course. The curriculum is designed to provide multidisciplinary knowledge and to endow the students with the ability to design mechatronics systems.

## **Academic Programmes :**

### **Post-graduate Level:**

- i. Degree offered : M.Tech. in Mechatronics
- ii. Sanctioned students' intake: 18 GATE qualified
- iii. Additional intake through other programmes: Nil
- iv. Specialisations: Mechatronics & Robotics

### **Doctoral Level**

- i. Degree offered : Ph.D.
- ii. No. of candidates: enrolled / registered / awarded : Enrolled 03



**Faculty Position**

Sanctioned faculty post: Nil Vacant post: Nil

The school is interdisciplinary in nature and faculty members from relevant departments/school extend support to conduct classes / laboratories

**Faculty profile**

| Name                  | Designation                               | Highest Qualification | Specialisation/ Research Area        | Contact No.<br>E-mail                             |
|-----------------------|---|-----------------------|--------------------------------------|---|
| Prof. Debjani Ganguly | Director & Associate Professor (EE Dept.) | M.E.                  | Power Electronics & Drives           | M: 9830306490<br>Email: ganguly.debjani@gmail.com |
| Dr. Subhasis Bhaumik  | Coordinator & Professor (AE&AM Dept.)     | Ph.D                  | Mechatronics & Robotics / Automation | M:9836044278<br>Email: sbhaumik_besu@yahoo.co.in  |

**Research Area:**

Dexterous Robotic Hand, Mobile Robots, Micro Systems, Teleportation, Unmanned Aerial Vehicle, Bio-medical and Exoskeleton Devices, Prosthetics, AI and Soft Computing, Intelligent Systems, Sensors Development

**Research Facilities:**

Bi-handed robot, humanoid robot, drives and control, sensors, image processing, mechanical motion transmission devices, data gloves, laser sensors, smart materials, haptic devices, embedded systems, Techscan pressure sensors, data acquisition system, virtual instrumentation, modeling and simulation software - LabView.

**Name of the Laboratories:**

1. Mechatronics Laboratory
2. Robotics Laboratory
3. Simulation Laboratory

### Sponsored Research

| On-going  | Sponsoring agency  |
|---|--|
| Development of a Sensor Integrated Multi Finger Dexterous Robot Hand with Data Glove Interface (4 years, June 2010- December 2014) Rs.61,38,500/- (in Robotics Lab, AE&AM Department) | BRNS, Dept. of Atomic Energy, BARC, Mumbai   |
| Development of Indigenous Low Cost Pressure Mat Based Gait Analyzer (3 years, December 2012 – December 2015), Rs. 46,37,937/-   | DST (Science for Equity, Empowerment & Development - SEED Division), New Delhi, 2012<br>Principal collaborating organization - NIOH, Kolkata |
| <i>Multisensory Myoelectric Controlled Intelligent Active Ankle Foot Prosthesis(3 years, Oct 2013-Oct 2016),Rs 44,40,000</i>  | DST,SERB, New Delhi (in collaboration with NIOH, Kolkata)  |

### Industry Institute Interaction:

- Central Scientific Instruments Organization (CSIR-CSIO), Chandigarh
- Central Mechanical Engineering Research Institute (CSIOR -CMERI), Durgapur
- Central Electronics Engineering Research Institute (CSIR-CEERI),Pilani
- National Institute for the Orthopaedically Handicapped (NIOH under MSJE, Govt. of India), Kolkata

### No. of Publications:

|                   |                           |
|-------------------|---------------------------|
| Journal           | - 1                       |
| Conference        | - 10                      |
| Books/ Monographs | - Nil                     |
| Book Chapter      | - 1 (under consideration) |

- I. A S Kundu, O Mazumder, R Chattaraj, S Bhaumik - Door negotiation of a omni robot platform using depth map based navigation in dynamic environment, Contemporary Computing (IC3), 2014 Seventh International Conference.

- II. A S Kundu, O Mazumder, R Chattaraj, S Bhaumik - Trajectory generation for myoelectrically controlled lower limb active knee exoskeleton, Contemporary Computing (IC3), 2014 Seventh International Conference on, 230-235
- III. O Mazumder, A S Kundu, R Chattaraj, S Bhaumik - Holonomic wheelchair control using EMG signal and joystick interface, Engineering and Computational Sciences (RAECS), 2014
- IV. O Mazumder, A S Kundu, S Bhaumik - Generating gait pattern of myoelectric active ankle prosthesis, Engineering and Computational Sciences (RAECS), 2014
- V. A S Kundu, O Mazumder, R Chattaraj, S Bhaumik - Close loop control of non holonomic WMR with augmented reality and potential field Engineering and Computational Sciences (RAECS), 2014
- VI. Ritwik Chattaraj, Bikash Bepari, Subhasis Bhaumik - Grasp mapping for Dexterous Robot Hand: A hybrid approach, IEEE Proceedings of Seventh International Conference on Contemporary Computing (IC3), Noida, 2014 , Pg No. 242-247
- VII. Ritwik Chattaraj, Srijan Bhattacharya, Ankur Roy, Abhra Mazumdar, Bikash Bepari, Subhasis Bhaumik - Gesture Based Control of IPMC Actuated Gripper, IEEE Proceedings of 2014 RAECS UIET Panjab University Chandigarh, 06 - 08 March, 2014
- VIII. Ritwik Chattaraj, Anirudha Bhattacharjee, Bikash Bepari, Subhasis Bhaumik - Design and Synthesis of a Four Fingered Articulated Dexterous Robot Hand, Proceedings of 1<sup>st</sup> International and 16<sup>th</sup> National Conference on Machines and Mechanism (iNaCoMM2013), IIT Roorkee, India, Dec 18-20 2013, Pg No. 694-699
- IX. Srijan Bhattacharya, Bikash Bepari and Subhasis Bhaumik - IPMC Actuated Compliant Mechanism Based Multi-Functional Multi-Finger Micro-Gripper, Mechanics based Design of Structures and Machines, International Journal of Taylor & Francis, Vol. 42, Issue 03, May 2014, pp. 312 – 325
- X. Ritwik Chattaraj, Srijan Bhattacharya, Bikash Bepari and Subhasis Bhaumik - Design and Control of Two Fingered Compliant Gripper for Micro Gripping, IEEE 3rd International Conference on Informatics, Electronics & Vision (ICIEV), Dhaka, Bangladesh, May 23 - 24, 2014
- XI. HabibMasum, Subhasis Bhaumik and Ranjit Ray - Conceptual Design of a Powered Ankle-Foot Prosthesis for Walking with Inversion and Eversion, 2nd International Conference on Innovations in Automation and Mechatronics Engineering (ICIAME-2014), Procedia Technology, Elsevier 2014

#### **Technology developed/ Innovations:**

Autonomous omni directional robotic vehicle, lower limb active exoskeleton; four fingered dexterous robotic hand

### **Foreign visits and Invited Lectures:**

1. Invited Talk and Workshop in Faculty Development Program on “Advancement in Instrumentation Engineering and Development in Process Automation (AIEDPA – 2014)” organized by AEIE, Department, RCCIIT, Baleghata, Kolkata, from 14<sup>th</sup> and 17<sup>th</sup> July, 2014.
2. Invited Talk - Institute of Engineering & Management, Kolaghat, JIS kalyani, Talk, Murshidabad Engineering College, Murshidabad, , NIT Durgapur

### **Visitors to your Department (Indian & Foreign)**

1. Prof G K Anantasuresh, IISC, Bangalore Visited our lab on December, 2013.
2. Dr. Naga Hanumaiah and his research team at Micro System Technology Laboratory, Mechanical Engineering Research Institute (CSIR – CMERI), Durgapur, India.
3. Dr. Debabrata Chatterjee, Chemistry and Biomimetics Laboratory at Mechanical Engineering Research Institute (CSIR – CMERI), Durgapur, India.

### **New Academic / Research Initiatives:**

Academic Collaboration – NIOH Kolkata and CMERI Durgapur



***School of VLSI Technology***



## About the department

The research and education at School of VLSI Technology is closely associated with industry and several other primary academic Institutions of repute with an aim to foster cutting edge research and establishes the School as one of the pronounced leaders in field of VLSI and Microelectronics.

In the School of VLSI Technology, We have sufficient latest VLSI tools and hardware in our VLSI and Embedded systems Laboratories. The UG/PG/Doctoral students from Information Technology/Computer Science/Electronic Engg./Electrical Engg. are getting exposure with these industry standard tools and equipment. In eastern India, only two or three university/institutes have this type of laboratory.

VLSI being an interdisciplinary field involving various aspects of electrical, communications, computer science, information technology, semiconductor physics and materials science, the SOVLSIT closely collaborates with other departments within BESU and other reputed academic institutions in both India and abroad to cater to the needs of the engineers in the making. Faculty members of this Institute are also running a number of industry and Govt. funded research projects with active participation of SOVLSIT. A number of tools have been developed to carry out the VLSI research. About 8 PhD theses have been completed during the last five years in the field of VLSI design and test. Another seven students have already been registered for PhD in this area.

The School was established on July, 2006 with the introduction of a flagship course of M-Tech (VLSI Design) with an intake of 12 students under special requirement of a Special Manpower Development Project in VLSI Design and related Software (Phase II), a mission project of Govt. of Government of India to promote the research and education in the various areas of VLSI Design. The need to integrate to efforts of scientists and engineers working with different fields of microelectronics and semiconductors devices has been the primary motivation of creation of this school. The research and education at School of VLSI Technology is closely associated with industry and several other primary academic Institutions of repute with an aim to foster cutting edge research and establish the School and one of the pronounced leader in field of VLSI and Microelectronics.

M.Tech (VLSI Design) course under SMDP-II project was started during academic session 2006-2007 and continues to be a sought after program of the institute. Students of SOVLSIT have established their credentials through recruitment of international VLSI Design Companies and selection in PhD admission to different research laboratories/ IIT/IISC/ISI/Foreign Universities.

### Academic Programmes:

#### Undergraduate Level

- |      |   |   |
|------|---|---|
| I.   | Degree offered  | : |
| II.  | Sanctioned students' intake   | : |
| III. | Additional intake through lateral entry in 3 <sup>rd</sup> Semester | : |

#### Post Graduate Level

- |      |   |   |                        |
|------|---|---|------------------------|
| I.   | Degree offered  | : | M. Tech in VLSI Design |
| II.  | Sanctioned students' intake                           | : | 20                     |
| III. | Additional intake through other programmes (i.e. QIP) | : |                        |
| IV.  | Specializations in                                    | : | VLSI Design            |



## Doctoral & Post Doctoral Research Programme

I. Degree offered : PhD (Engineering / Science / Humanities & Management Science) :

**PhD (Engineering)**

II. No. of Candidates enrolled in 2013: 3

| Sl. No. | Scholar's Name      |
|---------|---------------------|
| 1.      | Sayan Kanungo       |
| 2.      | Sandip Bhattacharya |
| 3.      | Subhajit Das        |

III. No. of Candidates registered in 2013: 2

| Sl. No. | Scholar's Name   |
|---------|------------------|
| 1.      | Sabir Ali Mondal |
| 2.      | Kunal Sinha      |

IV. No. of Candidates awarded: 3

| Sl. No. | Scholar's Name    |
|---------|-------------------|
| 1.      | Nachiketa Das     |
| 2.      | Debaprasad Das    |
| 3.      | Prabir Kumar Saha |

**Faculty Position:** Sanctioned faculty post ... 3 (Contractual) ..... Vacant Post ...2 .....

(a) Faculty profile (in the following table)

| Name                     | Designation         | Highest Qualification    | Specialization / Research Area  | Contact No. and E - mail   |
|--------------------------|---------------------|--------------------------|---|--|
| Prof. Hafizur Rahaman    | Director            | PhD.<br>Post-doc(UK)     | Logic Synthesis, VLSI Design and Test, CAD for Microfluidic Biochips, Nanotechnologies, Reversible Computing                    | +91-33-26684561/62/63<br>hafizur@vlsi.iests.ac.in                                    |
| Mr. Pranab Ray           | Assistant Professor | M. Tech.                 | Biochip design Automation, Embedded System, Algorithm and data structures , VLSI physical design, Object oriented System Design | 033-22270143<br>9433800260<br>ronmarine@yahoo.co.in                                  |
| Mr. Sudip Ghosh          | Assistant Professor | M. Tech.                 | Digital VLSI Design & VLSI Architectures, Digital Image Watermarking, Synthesis and Verification, VLSI Testing.                 | 033-22191833<br>8017040884<br>sudip_etc@yahoo.co.in<br>sudip.ghosh@vlsi.becs.ac.in   |
| Dr. Amretashis Sengupta  | INSPIRE Faculty     | Ph.D (Engg) and Post-doc | 2-D materials based FET, atomistic simulations  | 033-26689016,<br>9434879016<br>a.sengupta@vlsi.becs.ac.in,<br>dr.a.sengupta@ieee.org |
| Mr. Partha Sarathi Gupta | Project Faculty     | M. Tech.                 | Low power VLSI design, Evolutionary Algorithms.   | 9674128771<br>033-24152571<br>gupta_parthasarathi@yahoo.co.in                        |
| Mr. Manodipan Sahoo      | Project Faculty     | M. Tech                  | Carbon Nanotube Based Interconnects and Devices   | 9038496889<br>manodipansahoo@gmail.com   |

### **Awards and Laurels received by the faculty members :-**

- Dr. Amretashis Sengupta: DST INSPIRE Faculty award 2013 (II), DST Post-doctoral Fellowship in Nano Science and Tech. 2012-13.
- Hafizur Rahaman and Manodipan Sahoo (PhD Student) received Best Paper Award by IEEE IDICON, December 2013 held at IIT, Bombay, for the work, “Modelling of Crosstalk Delay and Noise in Single-walled Carbon Nanotube Bundle Interconnects”.
- DST-DAAD has awarded collaborative research fellowship to Prof. Hafizur Rahaman under Indo-German (DST-DAAD) Bilateral Cooperation during 2013-2015 (with Prof. Rolf Drechsler, Professor and Director, Computer Architecture Group, University of Bremen, Germany).

### **Research area (only mention broad titles without description in detail) :**

1. Digital VLSI Design
2. Analog and Mixed Signals
3. VLSI Testing
4. Nanotechnology
5. Bio-chip Design Automation
6. NOC & SOC Design
7. FPGA Synthesis and Testing
8. VLSI Physical Design Automation
9. Digital Watermarking
10. VLSI architectures
11. System on chip architectures
12. Network on Chip
13. 3D IC and 3D Biochips

### **Research facilities: (name specific equipment / picture, infrastructure etc)**

#### **EDA Tools**

|  |
|--|
| 1. Mentor Graphics                                 |
| 2. Synopsys  |
| 3. Cadence   |
| 4. NI LabVIEW                                      |
| 5. Xilinx ISE 14.7 Webpack (for FPGA Applications) |
| 6. Vivado Design Suite                             |
| 7. Matlab  |
| 8. Synopsys TCAD                                   |

#### **Hardware Devices and Design Kits**

| <b>S.No.</b> | <b>Item/Description</b>   | <b>Quantity</b> |
|--------------|---|-----------------|
| 1.           | Agilent 16802A Logic Analyzer   | 1               |
| 2.           | Agilent 34410A 6.5 Digital Multimeter   | 4               |
| 3.           | Agilent 33522A, 2-Channel, 250 MSa/s, 30MHz Function/Arbitrary Waveform Generator | 1               |
| 4.           | Agilent N9000A, 9 KHz-7.5 GHz, CXA Signal Analyzer                                | 1               |
| 5.           | Agilent E3631A, 0-6V, 5A/0-(+-)25V, 1A, Triple Output DC Power Supply             | 1               |
| 6.           | Agilent E3620A, 0-25V, 0-1A, Dual Output DC Power Supply                          | 1               |
| 7.           | Agilent Logic Analysis Software   | 2               |
| 8.           | Oscilloscope Logic Channels, Agilent DSO-X-MSO-X, 1GHz, MSO Upgradation           | 1               |

|     |  |     |
|-----|--|-----|
| 9.  | Digital Storage Oscilloscope, Agilent DSOX3104A, Oscilloscope, 4 channel, 1GHz | 1   |
| 10. | Agilent N2874A, Probe – 10:1 1.5GHz  | 2   |
| 11. | Agilent DSOXLAN, Module – LAN/VGA  | 1   |
| 12. | Universal Electronics Trainer Kit (Microlab-II)                                | 1   |
| 13. | Pro-Ject Board GL  | 20  |
| 14. | ARM mbed NXP LPC 1768 Microcontroller Kit                                      | 100 |
| 15. | Xilinx XUP Virtex-II Pro   | 5   |
| 16. | Xilinx XUP Virtex-II Pro Development System Software                           | 5   |
| 17. | Digilent VDEC1 Board   | 5   |
| 18. | Digilent NEXYS-2 Board   | 1   |
| 19. | Xilinx Spartan 3E Kit  | 15  |
| 20. | Digilent DIO5 for the XUP-V2 Pro Board   | 5   |
| 21. | Digilent Analog I/O 1  | 5   |
| 22. | L.T.E. Switching Power Adapter   | 5   |
| 23. | Kingston 256MB PC1200 CL2.5-184-Pin DIMM (RAM)                                 | 5   |
| 24. | Xilinx Virtex-6 FPGA Embedded Kit  | 1   |
| 25. | Xilinx Platform Cable USB II   | 1   |
| 26. | Xilinx Virtex-6 LX130T Evaluation Kit  | 1   |
| 27. | Xilinx FMC Connectivity Mezzanine Card   | 1   |
| 28. | Xilinx Virtex-6 DSP Development Kit  | 1   |
| 29. | Xilinx Compact Flash Kingston 512MB (Memory Card)                              | 10  |
| 30. | Server   | 8   |
| 31. | Workstation  | 25  |
| 32. | Desktop PC   | 32  |
| 33. | Redhat Linux OS  | 12  |
| 34. | External DVD Writers   | 3   |
| 35. | Wall Mount Rack  | 3   |
| 36. | Server Rack  | 1   |
| 37. | Printer  | 2   |
| 38. | Scanner  | 2   |
| 39. | Canon A3 Digital Copier iR 2420L   | 1   |
| 40. | Canon DADF P2  | 1   |
| 41. | Canon Duplex Unit – A1   | 1   |
| 42. | 2KVA Voltage Transformer   | 1   |
| 43. | UTP Patch Pannel   | 6   |
| 44. | LACIE IEX External DVD Writer  | 3   |
| 45. | Network Switch   | 8   |
| 46. | LCD Projector  | 3   |
| 47. | Online UPS   | 4   |

### ***Academic and Research Infrastructure***

In the School of VLSI Technology, We have following latest VLSI tools and hardware in our VLSI and Embedded systems Laboratories. The UG/PG/Doctoral students from Information Technology/Computer Science/Electronic Engg./Electrical Engg. are getting exposure with these industry standard tools and equipment. In eastern India, only two or three university/institutes have this type of laboratory.

#### **EDA Tools:**

- ☐ Mentor Graphics
- ☐ Synopsys

- ☐ Cadence
- ☐ Xilinx ISE WebPack (FPGA Applications)
- ☐ Vivado Design Suite
- ☐ Matlab
- ☐ Synopsys TCAD

#### **FPGA Board**

- ☐ FPGA Spartan 3E Kits
- ☐ XUP Virtex-II Pro Board
- ☐ Virtex 6 Pro Board
- ☐ Video Decoder Board
- ☐ Other Accessories

#### **Name of the laboratories**

|    |  |
|----|--|
| 1. | Ganapati Sengupta VLSI Laboratory (Research Lab) |
| 2. | SMDP-II Laboratory                               |
| 3. | Incubation Centre Lab                            |

#### **Consultancy Work**

##### **Support staff position:**

- (a) (i) Sanctioned technical post .....
- (ii) Technical staff profile (in the following table)

| <b>Name</b>      | <b>Designation</b>                  | <b>Highest Qualification</b>  | <b>Contact No.</b> | <b>E-mail</b>           |
|------------------|-------------------------------------|-------------------------------|--------------------|-------------------------|
| Sri Goutam Paul  | Technical Assistant (Project Staff) | B-Tech (E.C.E.)               | 9874405431         | goutam.paul82@lycos.com |
| Smt. Ratna Ghosh | Technical Assistant                 | D.E.T.C., A.M.I.E. (Pursuing) | 9239825264         | ratna_vlsi@yahoo.co.in  |

#### **Ongoing Sponsored Research / projects : (mention area)**

| <b>Project Title</b>             | <b>Sponsoring agency</b> | <b>Duration</b>   |
|----------------------------------|--------------------------|-------------------|
| VLSI Design Project (1.64 crore) | DIT, WB                  | 2010-2014 (March) |

#### **Details of publications of each faculty members (2013 – 14)**

##### **Journals**

- Nachiketa Das, Pranab Roy, Hafizur Rahaman: Bridging fault detection in cluster based FPGA by using Muller C element. Computers & Electrical Engineering 39(8): 2469-2482 (2013).
- Nachiketa Das, Pranab Roy, and Hafizur Rahaman, "Detection of Crosstalk Fault in Field Programmable Gate Arrays (FPGA). " accepted in Journal of IEI(B) (Springer).
- A. Sengupta, D. Saha, T.A. Niehaus and S. Mahapatra, 'Effect of line defects on the electrical transport properties of monolayer MoS2 sheet', accepted for publication in IEEE Transactions on Nanotechnology.

4. D. Saha, A. Sengupta and S. Mahapatra, 'Impact of Stone-Wales and lattice vacancy defects on the electro-thermal transport of the free standing structure of metallic ZGNR' accepted for publication in Journal of Computational Electronics (appearing 2014).
5. Amretashis Sengupta and Chandan Kumar Sarkar, 'Study on Nanoparticles Embedded Multilayer Gate Dielectric MOS Non Volatile Memory Devices', accepted in International Journal of Nanotechnology – IEEE INEC Special Issue (appearing in 2014).
6. A. Chanana, A. Sengupta, and S. Mahapatra, "Performance Analysis of Boron Nitride Embedded Armchair Graphene Nanoribbon MOSFET with Stone Wales Defects" Journal of Applied Physics Vol. 115, Issue 3, pp. 034501 (2014).
7. Amretashis Sengupta and Santanu Mahapatra, 'Negative differential resistance and effect of defects and deformations in MoS<sub>2</sub> armchair nanoribbon MOSFET', Journal of Applied Physics. Vol. 114, pp. 194513 (2013).
8. Amretashis Sengupta Ram Krishna Ghosh and Santanu Mahapatra, 'Performance Analysis of Strained Monolayer MoS<sub>2</sub> MOSFET', IEEE Transactions on Electron Devices Vol. 60, pp. 2782 (2013).
9. Amretashis Sengupta and Santanu Mahapatra, 'Performance limits of transition metal dichalcogenide (MX<sub>2</sub>) nanotube surround gate ballistic field effect transistors', Journal of Applied Physics. Vol. 113, pp. 194502 (2013).
10. Amretashis Sengupta, and Chandan Kumar Sarkar, 'Surface Potential Based Analytical Modeling of Double Gate MOSFET Non-Volatile Memory with Si and Au Nano-dots Embedded Gate Dielectric', Journal of Computational & Theoretical Nanoscience, Vol. 10, No. 4, pp. 906-913 (2013)
11. Manodipan Sahoo, Prasun Ghosal and Hafizur Rahaman, "Performance Modeling and Analysis of Carbon Nanotube Bundles for Future VLSI Circuit Applications", Journal of Computational Electronics, Springer publications, vol.13, no. 3, pp.-673-688, September 2014. [Online] DOI 10.1007/s10825-014-0587-7.

### International Conference

12. Pranab Roy, Rupam Bhattacharya, Pampa Howladar, Hafizur Rahaman, Parthasarathi Dasgupta, "3D Biochips: new proposed architectures and design advantages for ATDA based 3D applications in Digital Microfluidic Biochips", IEEE 3DIC 2014, Kinsale, Cork, Ireland (accepted)
13. Pranab Roy, Tamasa Chakraborty, Hafizur Rahaman, Parthasarathi Dasgupta, "Multilevel homogeneous detection analyzer for medical diagnostic application in Digital Microfluidic Biochips", Proc. of IEEE ISED, Suratkal, 2014 (accepted).
14. Pranab Roy, Samadrita Bhattacharya, Rahaman, Parthasarathi Dasgupta, "A new technique for layout based customized functional testing of modules in Digital Microfluidic Biochips", proc. of IEEE EWDTS, 2014, Kiev, Ukraine (accepted).
15. Pranab Roy, Aatreyi Bal, Tamasa Chakraborty, Mriganka Chakraborty, Hafizur Rahaman, Parthasarathi Dasgupta, "Optical detection in Biochips: A fuzzy based detection analyzer for homogeneous samples in DMFBs" – IEEE CYBER, Hongkong, China, 2014.
16. Pranab Roy, Aatreyi Bal, Mahua Raha Patra, Hafizur Rahaman, Parthasarathi Dasgupta, "Automated two stage detection and analyzer system in Multipartitioned Digital Microfluidic Biochips" – IEEE, ISCAS, Melbourne, Australia, 2014 (accepted).
17. Pranab Roy, Hafizur Rahaman, Parthasarathi Dasgupta, "A layout based customized testing technique for total microfluidic operations in Digital Microfluidic Biochips" – IEEE, DDECS, Warsaw, Poland, 2014 (accepted).
18. Pranab Roy, Samadrita Bhattacharya, Rupam Bhattacharya, Firdousi Jamil Imam, Hafizur Rahaman, Parthasarathi Dasgupta, "A novel wire planning technique for optimum pin utilization in Digital Microfluidic Biochips" – Proc. of 27th IEEE International conference of VLSI Design, 2014, Mumbai, India.
19. Pranab Roy, Samadrita Bhattacharya, Rupam Bhattacharya, Hafizur Rahaman, Parthasarathi Dasgupta, "A new method for route based synthesis and placement in Digital Microfluidic Biochips" Proc. Of VDAT, Springer CCIS, Jaipur, India, 2013.
20. Pranab Roy, Aatreyi Bal, Mahua Raha Patra, Hafizur Rahaman, Parthasarathi Dasgupta, "Feedback based automated detection analysis in Digital Microfluidic Biochip Systems" – Proc. of IEEE International Conference on Control, Automation, Robotics and Embedded systems (CARE-2013), Jabalpur, India.

21. Pranab Roy, Mahua Raha Patra, Hafizur Rahaman, Parthasarathi Dasgupta, "An intelligent Biochip System for Diagnostic Process Flow based Integration of Combined Detection Analyzer", - Proc. of IEEE ISED, Singapore, December, 2013.
22. Pranab Roy, Parthasarathi Gupta, Hafizur Rahaman, Parthasarathi Dasgupta, "A new customized testing technique using a novel design of droplet motion detector for digital microfluidic Biochip systems" – Proc of IEEE ICACCI, Mysore, India, 2013.
23. Pranab Roy, Rupam Bhattacharya, Pampa Howladar, Hafizur Rahaman, Parthasarathi Dasgupta, "A new cross contamination aware routing method with intelligent path exploration in Digital Microfluidic Biochips" Proc. Of IEEE DTIS, Abu Dhabi, UAE, 2013.
24. Pranab Roy, Mahua Raha Patra, Hafizur Rahaman, Parthasarathi Dasgupta, "Digital Microfluidic System: A new design for heterogeneous sample based integration of multiple DMFBs" IEEE, ISCAS, Beijing, China, 2013
25. Sudip Ghosh, Somsubhra Talapatra, Navonil Chatterjee, Nagakumar Reddy, Santi P Maity and Hafizur Rahaman, "Multiplier-less VLSI Architecture of 1-D Hilbert Transform pair using Biorthogonal Wavelets" in 2nd IEEE International Conference of Informatics, Electronics & Vision (ICIEV 2013) from 17-18 May 2013, at University of Dhaka, Bangladesh. Pages: 1 – 6
26. Sudip Ghosh, Santi P. Maity and Hafizur Rahaman, "Multiplier-less VLSI Architecture of 1-D Hilbert Transform pair using Biorthogonal Wavelets for QCM-SS image Watermarking", in 4<sup>th</sup> IEEE International Conference on Computer and Communication Technology (ICCCT- 2013 ) from 20<sup>th</sup> -22<sup>nd</sup> September 2013, at Motilal Nehru National Institute of Technology (MNNIT), Allahabad, India. Pages: 5-10
27. Sudip Ghosh, Bijoy Kundu, Debopam Datta, Santi P Maity and Hafizur Rahaman "Design and Implementation of Fast FPGA based Architecture for Reversible Watermarking" in IEEE International Conference on Electrical Information and Communication Technology (EICT-2013) from 19-21 December 2013, at Khulna University of Engineering and Technology (KUET), Khulna, Bangladesh. Pages: 1-6
28. Sudip Ghosh, Arijit Biswas, Santi P Maity and Hafizur Rahaman "Hadamard Walsh and Paley Ordered DFWHT: A Study and Implementation on FPGA" in IEEE CALCON 2014 National Conference on Electrical, Electronics, and Computer Engineering (A Triennial Event of IEEE Kolkata Section) from November 7-8, 2014 at Hotel Park Prime Kolkata, India ISBN 978-93-833-0383-0
29. Sudip Ghosh, Nachiketa Das, Subhajit Das, Santi P Maity and Hafizur Rahaman "FPGA and SoC Based VLSI Architecture of Reversible Watermarking Using Rhombus Interpolation By Difference Expansion" in 11th IEEE India Conference INDICON 2014 from 11th to 13th December 2014 at Yashada, Pune, India
30. Sudip Ghosh, Arijit Biswas, Santi P Maity and Hafizur Rahaman "Design of A Low Complexity and Fast Hardware Architecture for Digital Image Watermarking in FWHT Domain on FPGA" in 5th IEEE International Symposium on Electronic System Design (ISED 2014) from December 15 - 17, 2014 at NIT Surathkal, Mangalore, India
31. Sudip Ghosh, Arijit Biswas, Santi P Maity and Hafizur Rahaman "Design of an Improved Algorithm for Blind Digital Image Watermarking Using Both Grayscale and Binary Watermark in DFWHT Domain" in 8th IEEE International Conference on Electrical and Computer Engineering (ICECE 2014) from 20-22 December 2014 at Pan Pacific Sonargaon, Dhaka, Bangladesh
32. Sudip Ghosh, Nachiketa Das, Subhajit Das, Santi P Maity and Hafizur Rahaman "Digital Design and Pipelined Architecture for Reversible Watermarking Based on Difference Expansion using FPGA" in 13th IEEE International Conference on Information Technology (ICIT 2014) from 22nd -24th December, 2014 at Bhubaneswar, Orissa, India.
33. Manodipan Sahoo and Hafizur Rahaman, "Impact of Line resistance variations on Crosstalk delay and noise in Multilayer Graphene Nano Ribbon Interconnects", Proc. of 5<sup>th</sup> IEEE ISED, NITK Surathkal, 2014 (accepted).
34. Manodipan Sahoo and Hafizur Rahaman, "An ABCD Parameter Based Modeling and Analysis of Crosstalk Induced Effects in Multilayer Graphene Nano Ribbon Interconnects", Proc. of IEEE ISCAS, 2014, pp. 1138-1142.
35. Manodipan Sahoo, Prasun Ghosal and Hafizur Rahaman, "An ABCD Parameter Based Modeling and Analysis of Crosstalk Induced Effects in Multiwalled Carbon Nanotube undler Interconnects", IEEE 27<sup>th</sup> International Conference on VLSI Design, IIT Bombay, India, 2014, pp. 433-438.

36. Manodipan Sahoo, Prasun Ghosal and Hafizur Rahaman, "An ABCD Parameter Based Modeling and Analysis of Crosstalk Induced Effects in Single-Walled Carbon Nanotube Bundle Interconnects," IEEE/ACM Asia Symposium and Exhibit on Quality Electronic Design (ASQED), 2013, pp. 264-273.
37. Manodipan Sahoo and Hafizur Rahaman, "Modeling of Crosstalk Delay and Noise in Single-walled Carbon Nanotube Bundle Interconnects", IEEE INDICON, IIT Bombay, India, 2013, pp. 1-6.
38. Manodipan Sahoo, Hafizur Rahaman and Bhargab Bhattacharya, "Impact of Inductance on the Performance of Single Walled Carbon Nanotube Bundle Interconnects", 4<sup>th</sup> IEEE International Symposium on Electronic System Design (ISED), 2013, pp. 16-20.
39. Manodipan Sahoo and Hafizur Rahaman, "Performance Analysis of Multiwalled Carbon Nanotube Bundles", 33<sup>rd</sup> IEEE International Scientific Conference Electronics and Nanotechnology (ELNANO), pp. 200-204, 2013
40. Manodipan Sahoo and Hafizur Rahaman, "Modeling of Crosstalk Induced Effects in Nanoscale Copper Interconnects", IEEE EICT, KUET, Bangladesh, 2013, pp. 1-6
41. Sourav Chakraborty, Manodipan Sahoo and Hafizur Rahaman, "A 1.8 V 64.9 uW 54.1 dB SNDR 1st Order Sigma-Delta Modulator Design Using Clocked Comparator Based Switched Capacitor Technique", IEEE Asia Symposium and Exhibit on Quality Electronic Design (ASQED), 2013, pp. 220-226
42. Sabir Ali Mandal, Sourav Pal, Manodipan Sahoo, Pradip Mondal and Hafizur Rahaman, "A New Feedback Circuit Based Charge-pump for a Wide-range and Low-jitter DLL suitable for PET Imaging Applications", Proceedings of IEEE ICDCS, India, 2014.
43. Indrajit Das, Manodipan Sahoo, Pranab roy and Hafizur Rahaman, "A 45 uW 13 pJ/conv-step 7.4 ENOB 40 kS/s SAR ADC for Digital Microfluidic Biochip Applications", International Symposium on VLSI Design and Test (VDAT) 2014, PSG College of Technology, Coimbatore.
44. Madhurima Guha, Amretashis Sengupta, Manodipan Sahoo and Hafizur Rahaman, "Effect of Defects on Performance and Signal Integrity of Multilayer GNR Interconnects", INUP Familiarization Workshop on Compact Modeling, IISc, August, 2014.

**Book:**

**Title** : Carbon Nanotube and Graphene Nanoribbon Interconnects,  
**Authors** : Debaprasad Das and Hafizur Rahaman  
**Publishers** : CRC Press (Taylor & Francis Group), USA

**Journal** = 11  
**Conference** = 33  
**Books / Monographs** = 1

**WORKSHOPS /SEMINARS / SYMPOSIUMS / CONFERENCES / SHORT-TERM COURSES ATTENDED in 2013 – 14**

| <b>1. Manodipan Sahoo</b> |  |  |                                   |
|---------------------------|--|--|-----------------------------------|
| <b>SL. No.</b>            | <b>TOPIC</b>   | <b>HELD AT</b>                             | <b>DURATION</b>                   |
| 1.                        | IEEE/ACM Asia Symposium and Exhibit on Quality Electronic Design (ASQED) | Penang, Malaysia                           | 26-28 August, 2013                |
| 2.                        | IEEE INDICON   | IIT Bombay                                 | 13-15 December, 2013              |
| 3.                        | ISTE Workshop on Analog Electronics                                      | BESU, Shibpur (Conducted by IIT Kharagpur) | 4-14 June, 2013                   |
| 4.                        | National Seminar on Research Scholars' day                               | BESU, Shibpur                              | 29-30 <sup>th</sup> January, 2014 |
| 5.                        | Nanoelectronics and Biochips   | ISI Kolkata                                | 18-19 March, 2014                 |

| 6.                             | Emerging and Post CMOS Technologies   | IEST, Shibpur                       | 16-18 June, 2014                                |
|--------------------------------|---|-------------------------------------|---|
| 7.                             | Nanotechnology and Biochip  | IEST, Shibpur                       | 1-3 July, 2014                                  |
| 8.                             | INUP Familiarization workshop on Compact Modeling   | IISc, Bangalore                     | 22-23 <sup>rd</sup> August, 2014                |
| <b>2. Pranab Ray</b>           |   |                                     |   |
| 1.                             | National Seminar on Research Scholars' day  | BESU, Shibpur                       | 29-30 <sup>th</sup> January, 2014               |
| 2.                             | Emerging and Post CMOS Technologies   | IEST, Shibpur                       | 16-18 June, 2014                                |
| 3.                             | Nanoelectronics and Biochips  | ISI ,Kolkata                        | 18-19 March, 2014                               |
| 4.                             | IEEE ISD Symposium 2013   | NTU,Singapore                       | 12-13 December,2013                             |
| 5.                             | IEEE CARE 2013  | IIITDM,Jabalpur                     | 17-18 December,2013                             |
| 6.                             | VLSI Design Conference,2014   | IIT ,Mumbai                         | 5-9 <sup>th</sup> January,2014                  |
| 7.                             | VDAT,2013   | NIT,Jaipur                          | 27-30 July,2013                                 |
| 8.                             | Nanotechnology and Biochip  | IEST, Shibpur                       | 1-3 July, 2014                                  |
| <b>3. Amretashis Sengupta</b>  |   |                                     |   |
| 1.                             | International CeCAM Workshop High performance models of charge transport in large scale systems | BCCMS), Universitat Bremen, Germany | 6th – 10th October , 2014                       |
| 2.                             | INUP Compact modeling workshop  | IISc, Bangalore                     | 22 - 23 August, 2014                            |
| 3.                             | 2-Dimensional Channel Materials based Next Generation Nano-scale MOS devices                    | NIT Sikkim                          | 05 March, 2014                                  |
| 4.                             | Emerging and Post CMOS Technologies   | IEST, Shibpur                       | 16-18 June, 2014                                |
| 5.                             | Nanotechnology and Biochip  | IEST, Shibpur                       | 1-4 July, 2014                                  |
| <b>4. Partha Sarathi Gupta</b> |   |                                     |   |
| 1.                             | ISTE Workshop on Analog Electronics   | BESU, Shibpur (By IIT KGP)          | 4-14 June, 2013                                 |
| 2.                             | National Seminar on Research Scholars' day  | BESU, Shibpur                       | 29-30 <sup>th</sup> January, 2014               |
| 3.                             | Emerging and Post CMOS Technologies   | IEST, Shibpur                       | 16-18 June, 2014                                |
| 4.                             | Nanotechnology and Biochip  | IEST, Shibpur                       | 1-3 July, 2014                                  |
| 5.                             | INUP Familiarization workshop on Compact Modeling   | IISc, Bangalore                     | 22-23 <sup>rd</sup> August, 2014                |
| <b>5.Sudip Ghosh</b>           |   |                                     |   |
| SL. No.                        | TOPIC   | HELD AT                             | DURATION  |
| 1.                             | Application of Simulators in Photonics,   | Radio Physics, C.U.                 | 11 <sup>th</sup> – 15 <sup>th</sup> March, 2013 |
| 2.                             | 4 <sup>th</sup> ICCCT- 2013   | MNNIT, India.                       | 20/09/13 -22/09/13                              |
| 3.                             | National Seminar on Research Scholars' day  | BESU, Shibpur                       | 29-30 <sup>th</sup> January, 2014               |
| 4.                             | Emerging and Post CMOS Technologies   | IEST, Shibpur                       | 16-18 June, 2014                                |
| 5.                             | Nanotechnology and Biochip  | IEST, Shibpur                       | 1-3 July, 2014                                  |
| 6.                             | Summer School on Fundamentals of Digital Design Automation                                      | ISI Kolkata                         | July 22-26, 2014                                |

#### **Patents / Invention Disclosure / Technology Transfer / Copyright**

**Patents:** Budhaditya Majumdar, Sudipta Chakraborty, and Hafizur Rahaman, “A Novel Reusable Sub Volt Differential Amplifier Module for Use as a Preamplifier Output Stage”, Indian Patent Application Filed on 13<sup>th</sup> February 2013, Docket Number 170



**Seminar / Workshops / Conferences / Training programme organized by the department (2013 -14)**

**Technology Developed / Innovations**

**India Chip Programme:** Following Chip has been fabricated and tested **under this program.**

A Chip on “Transistor Level S-Box Circuit for Efficient Implementation of AES Algorithm” during 2012-2013.

**Foreign visits and Invited Lectures**

- Amretashis Sengupta ‘Study of next generation 2-D channel material MOSFETs with empirical tight binding – NEGF formalism’ at the International CeCAM Workshop High performance models of charge transport in large scale systems, held at Bremen Center for Computational Materials Science (BCCMS), Universitat Bremen, Germany , 6th – 10th October 2014.
- Amretashis Sengupta, “Semi-Empirical tight binding methods for simulation of transition metal dichalcogenide FETs” at the INUP Compact modeling workshop, held at IISc, Bangalore, 22 - 23 August, 2014.
- Amretashis Sengupta, “2-Dimensional Channel Materials based Next Generation Nano-scale MOS devices”, at NIT Sikkim, 05 March, 2014.

**Visitors to your Department (Indian & Foreign)**

The University has been privileged to receive a good number of important visitors both from India and abroad. Following illustrious visitors have visited the School of VLSI Technology.

1. Prof. Krishnendu Chakrabarty, Duke University, USA has delivered lecture on Testing and Design-for-Testability Solutions for 3D Integrated Circuits
2. Prof. Rolf Drechsler, University of Bremen, Germany, has delivered lecture on “Synthesis of Reversible Circuits using Decision Diagrams”
3. Dr. Tsung-Yi Ho, National Cheng Kung University, Taiwan, has delivered lecture on “Automation for Digital Microfluidic Biochips: from Fluidic-Level towards Chip-Level”
4. Dr. Kaushik Roy, Purdue University, West Lafayette, IN, has delivered lecture on “Beyond Charge Based Computing”

**New Academic / Research Initiatives**

**Academic Collaboration**

*We have already research collaboration with following University/Institutes...*

1. Department Computer Science and Engineering, Duke University, Durham, USA  
(Research Professor)
2. Department Computer Science, University of Bristol, UK (Royal Society Programme)

3. Department of Computer Science, University of Bremen, German (DST-DAAD Programme)

4. ACM Unit, Indian statistical Institute, Kolkata, India (DST Programme)

5. Department of Computer Science and Engineering, IIT Karagpur, India (India Chip Programme, PhD Collaboration)

6. Department of Electronics and Communication Engg., IIT Karagpur, India (India Chip Programme)

7. Department of Electronics and Communication Engg., IISC., Bangalore, India (India Chip Programme)

8. Institute of Radio Physics, Calcutta University, Kolkata, India (Research Collaboration, Clean Room Facility)

9. Department of Electronics Science, Calcutta University, Kolkata, India (Research Collaboration, Clean Room Facility)

10. Department of Electronics and Communication Engg., National Institute of Technology Karnatak, Surathkal, Mangalore, India (India Chip Programme, Research Collaboration)

11. Department of Electronics and Tele-communication Engg., Jadavpur University, Kolkata (India Chip Programme, Research Collaboration)

12. Department of Electronics and Tele-communication Engg., Jadavpur University, Kolkata (India Chip Programme, Research Collaboration)

### **Industrial Collaboration**

a) Sankalp Semiconductors

b) ARM India

c) VECC (R & D organization)



***Centre of Excellence for Green  
Energy and Sensor Systems***



## About the department

(A brief introduction about the history and development of the department / general information about the department with particular mention of its typical features within, say, 200 words)

Worldwide efforts are going on for switching over to sustainable alternative / renewable energy sources (non-polluting, non-fossil-fuel , environmentally friendly sources now known as . **Green energy** sources ). For these purposes, the University on its own has set up a Centre of Excellence entitled “Centre of Excellence for Green energy and Sensor Systems (CEGESS)” in November, 2009. The center envisages to provide the required environment and facilities for the scientists, engineers and technicians to work in critical R&D areas.

## Research & Development:

- i. Establishment of state of the art fabrication and characterization facility of crystalline silicon solar cells.
- ii. Establishment of state of the art fabrication and characterization facility of amorphous silicon solar cells.
- iii. Efficiency enhancement of c- Si, a- Si and other thin film solar cells.
- iv. New generation Solar cells and systems with novel nano- materials and green methods.
- v. New methodologies of solar energy storage (including super capacitors).
- vi. Advanced solar photovoltaic systems for lighting and power plant applications.
- vii. Smart Micro Grid System in the IEST Campus
- viii. Sensors (including bio-sensors, gas sensors, MEMS) based on novel materials (including quantum dots) .
- ix. Sensor systems. and techniques for agricultural, environmental, automobile and healthcare applications.

## Academic Programmes:

### Undergraduate Level

|   |   |
|---|---|
| Degree offered  | X |
| Sanctioned students' intake   | X |
| Additional intake through lateral entry in 3 <sup>rd</sup> Semester | X |

### Post Graduate Level

|   |  |
|---|--|
| Degree offered  | : <b>M.Tech</b>                                |
| Sanctioned students' intake:                          | <b>15 Nos</b>                                  |
| Additional intake through other programmes (i.e. QIP) | X  |
| Specialisations in                                    | <b>Renewable Energy Science and Technology</b> |

### Doctoral & Post Doctoral Research Programme

Degree offered : PhD (Engineering ) :

No of Candidates enrolled : **5 Nos**

No. of Candidates registered: **(6+4) Nos**

No. of Candidates awarded: **None**

### Faculty Position:

Faculty profile (in the following table )

| Name                         | Designation   | Highest Qualification  | Specialisation/ Research Area         | Contact No.<br>E-mail           |
|------------------------------|---|------------------------|---------------------------------------|---------------------------------|
| Prof. H.saha                 | BECA 1981<br>Chair<br>Professor<br>and<br>Coordinator | Ph.D                   | Photovoltaics<br>and Sensors          | shahiran@gmail.com              |
| Prof. A.K.Barua              | Hony.<br>Emeritus<br>Professor                        | Ph.D,<br>D.Sc<br>(h.c) | Photovoltaics                         | eruakb@yahoo.com                |
| Prof.<br>R.Bhattacharya      | Hony.<br>Adjunct<br>Professor                         | Ph.D                   | Photovoltaics<br>and Sensors          | raghubhatin@yahoo.com           |
| Prof. S.P. Gon<br>Chaudhuri  | Hony.<br>Adjunct<br>Professor                         | D. Sc<br>(h.c)         | Green Energy<br>and<br>Technology     | nbirt2008@yahoo.com             |
| Prof. Bibek<br>Bandyopadhyay | Hony.<br>Adjunct<br>Professor                         | Ph.D                   | Photovoltaics<br>and Solar<br>Thermal | bbibek@nic.in                   |
| Prof. Swapan K .<br>Datta    | Adjunct<br>Professor                                  | Ph.D                   | Photovoltaics<br>and Sensors          | swapansumana@gmail.com          |
| Dr. Nillohit<br>Mukherjee    | Assistant<br>Professor                                | Ph.D                   | Nanomaterials<br>and sensors          | nilsci@yahoo.co.uk              |
| Dr. Sumita<br>Mukhopadhyay   | Assistant<br>Professor                                | Ph.D                   | Photovoltaics                         | mukhopadhyay_sumita@yahoo.co.in |
| Dr. Avra Kundu               | Assistant<br>Professor                                | Ph.D                   | Photovoltaic,<br>Sensors and<br>MEMS  | avrakundu@rediffmail.com        |
| Dr. Chandan<br>Banerjee      | National<br>Solar<br>Science<br>Fellow,<br>MNRE       | Ph.D                   | Photovoltaics                         | chandanbanerjee74@gmail.com     |

**Awards and Laurels received by the faculty members : -**

**Prof. A.K.Barua**

1. Appointed Chairman of the Apex Committee of TIFAC for preparing Road Map for SPV for India by a reputed consulting firm
2. Appointed Chairmann of the Review Committee (indian side) for the Indo-UK collaborative project on excitonic solar cells.

**Prof. H. Saha**

1. “SENSOR ARRAY FOR MONITORING FOOD QUALITY” , May 9 – 10, 2013at National Seminar cum Workshop, Sensor and Sensing System for Taste Characterization of Food and Agro Products, IIT, Kharagpur
2. “Evolution of Solar PV Technologies & Systems: The Challenges and Way Ahead”, 50th Gyanodaya on 10th Aug 2013 at NTPC\_NETRA
3. “Present Status and Future Prospects of Solar Photovoltaic Systems”, 6<sup>th</sup> September 2013 at JBNSTS
4. “Plenary and Pavilion on Accessing Appropriate Technology for MSMEs” Synergy MSME 2013, 21<sup>st</sup> September 2013, at Milan Mela Ground, Kolkata
5. “Enhancement of Performance of Crystalline And Amorphous Silicon Solar Cells through Optical Engineering by Nanostructured Materials” , 4<sup>th</sup> December 2013 at IWPSD
6. “SOLAR PHOTOVOLTAICS : Current status and Future prospects” March 2014 at NIMTS
7. “Present Status and Future Prospects of Solar Photovoltaic Systems”, May 2014 at NFCECI-2014, CEM, Kolaghat
8. “Sun Rises in the East: Solar Power – Opportunities & Challenges”, 10<sup>th</sup> June 2014 at The Park , Kolkata
9. “Fabrication and Characterization of High Efficiency Crystalline Silicon Solar Cells and its efficiency Enhancement by metallic and dielectric Nano structures”, 28 June 2014 at KIIT, Bhubaneswar.
10. “Solar Energy: Prospects and challenges”, 19th August 2014 at Lady Brabourne College.

**Prof. Swapan K Datta**

**Reviewer**

1. Journal of Renewable and Sustainable Energy , AIP, USA
2. Solar Energy , Elsevier



### **Dr. Bibek Bandopadhyay**

1. Session Chair: 4<sup>th</sup> World Renewable Energy Technology Congress, New Delhi, September 2013
2. Session Chair: Sustainable Energy and Technological Development in Power Sector: 29<sup>th</sup> National Convention of Electrical Engineers, The Institution of Engineers (India), November, 2013.
3. Member, Technical Committee: ISES Solar World Congress 2013, Cancun, Mexico, November 2013.
4. Member, Technical Committee: 5<sup>th</sup> World Renewable Energy Technology Congress, New Delhi August 2014
5. Member, International Program Committee  
2nd International Conference on Green Energy & Technology(ICGET), September 2014 Dhaka, Bangladesh

#### ***Editorial Assignments***

- Associate editor: Solar Energy, Journal of International Solar Energy Society, Elsevier
- Associate Editor: Renewable and Sustainable Energy Reviews, Elsevier
- Member, Editorial Board: Indian Journal of Engineering and Materials Science

#### ***Reviewer***

- Elsevier Publication for books
- A few International and national journals for research papers.

#### ***Membership of Committees***

- Member, Board of Management, Indira Gandhi Delhi Technical University for Women, Delhi
- Member, Expert Committee, University Grants Commission
- Member of the Advisory Board: International PV Module Reliability Forum, USA
- Member: Non-Conventional Energy Section of Mechanical Engineering Division of the Bureau of Indian Standards(earlier: Chairman)
- Member, Scientific Expert Committee on Energy for International Multilateral & Regional S&T Program, Department of Science and Technology, GOI
- Member, Project Review Committee, Indo-UK Science Bridge Project, Department of Science and Technology, GOI
- Member, Committee on Solar Cities, Ministry of New and Renewable Energy GOI
- Chairman, Expert Committee on Cost and Policy Issues on Concentrating Solar Heat and Power, UNDP-GEF Project (MNRE)
- Member of the National Advisory Committee of the National Centre for Photovoltaic Research and Education, Indian Institute of Technology Bombay
- Member, Board of studies of Amity School of Applied Sciences (ASAS) of the Amity University Haryana

### **Dr. Sumita Mukhopadhyay**

1. Awarded under Fast Track Scheme for Young Scientists of Department of Science and Technology (DST), Govt. of India, 2013.

### **Dr. Chadán Banerjee**

1. National Solar Science Fellow, MNRE, Govt. of India, 2013.

### **Dr. Avra Kundu**

1. Acted as an **External Examiner** for M.Tech in Microelectronics and VLSI Technology Final Year Thesis Presentation and Viva-Voce, offered by West Bengal University of Technology (WBUT), Kolkata.

**Research area (only mention broad titles without description in detail) :**

**(a) Photovoltaic**

- (i) Fabrication of crystalline silicon solar cells
- (ii) Fabrication of amorphous silicon solar cells
- (iii) Efficiency enhancement of c- Si, a- Si and other thin film solar cells.
- (iv) New generation Solar cells and systems with novel nano- materials and green methods.
- (v) New methodologies of solar energy storage (including super capacitors).
- (vi) Advanced solar photovoltaic systems for lighting and power plant applications.
- (vii) Development of Smart Microgrid System in IEST campus

**(a) Sensors**

- (i) Sensors (including bio-sensors, gas sensors) based on novel materials (including quantum dots) and techniques for agricultural, environmental, automobile and healthcare applications. Sensor systems.

**Research facilities: (name specific equipment / picture, infrastructure etc)**

# Available Infrastructure

## Major Materials and Device Processing units

- Automated texturization bench
- Oxidation/ Diffusion Furnace
- Multizone PECVD Cluster
- Screen Printing machine
- Drying and Firing Belt furnaces
- E- Beam evaporation system
- Reactive ion etching system
- DC/RF Sputtering units
- Laser Scriber
- Planetary Ball Mill
- Deionized water system



**PECVD cluster tool**

## Major Characterization Equipments

- Solar Simulator and Spectral Response setup
- atomic force microscope
- Field Emission Scanning Electron Microscope
- Thickness profilometer
- Four probe Resistivity
- Optical microscope with image analyzer



**Reactive Ion Etching (RIE) System**



**Electron beam and Thermal Evaporation Unit**

## Major Equipments for SPV Systems

- 30 kW Solar Array Simulator
- 30 kW Grid Simulator



Name of the laboratories :

|   |  |
|---|--|
| <b>Solar photovoltaic fabrication laboratory</b>      |  |
| <b>Solar photovoltaic Characterization laboratory</b> |  |
| <b>Sensors design and development laboratory</b>      |  |
|   |  |

**Consultancy Work:**        **Sova Power Ltd** for design of special modules for solar tree and solar boat; **NKDA** for supervision of tendering and subsequent implementation engineering details for 500 KW peak Canal Top Solar Power Plant; **WBREDA** for preparation of Manuals and Display Boards for Roof Top Solar Power Plants in 100 schools in West Bengal; Roof Top Solar Power Plant policy for **KMDA** as Expert in Ashden India Initiative; **Oztron Energy Services** for Development of Grid Smoother Interfacing Unit for Grid Feed Solar Inverter.

**Support staff position:**

(i) Sanctioned technical post .....NIL.....

(ii) Technical staff profile (in the following table) ( All Contractual )

| <i>Name</i>          | <i>Designation</i>       | <i>Highest Qualification</i>                                    | <i>Contact No.</i> | <i>E- mail</i>                |
|----------------------|--------------------------|---|--------------------|-------------------------------|
| Sri Animesh Roy      | Senior Project Assistant | L.E.E   | 9836610595         | royanimesh53@yahoo.in         |
| Sri Sarat Sinha      | do                       | B.Sc (pure Sc.)   | 9231544357         | Singha_sarat@rediffmail.com   |
| Ms. Debashree Sardar | Project Assistant        | Dip CST   | 9748510108         | debashreesardar2008@gmail.com |
| Mr. Prasenjit Dey    | Project Assistant        | B.Sc (Physics Hons), Master of Public Systems Management (MPSM) | 9051059441         | prasenjit_dey46@yahoo.co.in   |
| Mr. Sushanta Nayak   | Project Assistant        | H.S   | 9088342594         | sushantanayak9@gmail.com      |
| Mr. Sandip Dutta     | Project Assistant        | B.Com (Hons)  | 929394853          | Sandip86@gmail.com            |
| Sri Rittwic Majumdar | Project Assistant        | M.Sc  | 9836424729         | bbmjmdr@yahoo.co.in           |
| Sri Biplob Saha      | Project Assistant        | Diploma engineer  | 8296200430         | Bsaha.elc@gmail.com           |

**Ongoing Sponsored Research / projects : (mention area)**

The centre has already been awarded a number of research projects in the field of solar energy and sensors by different funding agencies of the Govt. of India:

| Research Projects  | Funding Agency | Sanctioned Amount | Duration |
|--|----------------|-------------------|----------|
| Solar Photovoltaic Hub at BESU   | DST            | 12.46Crores       | 5 years  |
| Advanced Research on thin Film Silicon Solar Cells and PV systems                            | MNRE           | 14.76 Crores      | 4 years  |
| Smart MicroGrid at IEST  | WBREDA         | 55 lakhs          | 2 years  |
| Development of Multilayer TCO for High Efficiency Thin Film Solar Cell                       | DST            | 22.928 lakhs      | 3 years  |
| High Efficiency Triple Tandem and Heterojunction Silicon based Solar Cell<br>Acronym: HETHSI | MNRE           | 96.0 Lakhs        | 3 years  |

**Industry – Institute Interaction : MOU and collaborative work with the following Industries being Continued :**

- (a) Sova Power Limited , Durgapur
- (b) Agni Power Pvt Limited, Kolkata
- (c) Synchro Electronics , kolkata
- (d) Oztron Energy Systems, Australia
- (e) Hind Hi Vac Ltd, Bangalore

**Details of publications of each faculty member (2013 – 14)**

Journal ...33.....

Conference ...14.....

Books / Monographs .....

(List to be included)

**Journal Publications:**

1. “Development of n- $\mu$ c-SiO:H as cost effective back reflector and its application to thin film amorphous silicon solar cells.”, Chandan Banerjee, T Srikanth, U Basavaraju, R M Tomy, M G Sreenivasan, K Mohanchandran, S Mukhopadhyay, A K Barua, Solar Energy 97 (2013) 591.
2. “Development of oxide based window and buffer layer for single junction amorphous solar cell: Reduction of light induced degradation.”, Gourab Das, Sourav Mandal, M. Rajive Tomy, Chandan Banerjee, Sumita Mukhopadhyay, A.K. Barua, Materials Science in Semiconductor Processing 24 (2014) 50.
3. “Study of resonance energy transfer between MEH-PPV and CuFeS<sub>2</sub> nanoparticle and their application in energy harvesting device”, Animesh Layek, Somnath Middya, Arka Dey, Mrinmay Das, Joydeep Datta, Chandan Banerjee, Partha Pratim Ray, Journal of Alloys and Compounds, 613 (2014) 364.

4. "Role of Zinc Oxide Nanomorphology on Schottky Diode Properties", Somnath Middya, Animesh Layek, Arka Dey, Mrinmay Das, Joydeep Datta, Chandan Banerjee, Partha Pratim Ray, Chemical Physics Letters 610 - 611 (2014) 39.
5. "Fabrication of single junction amorphous silicon solar cell using novel n type nanocrystalline SiOx:F:H back reflector" Sourav Mandal, Gourab Das, Sukanta Dhar, M. Rajive Tomy, Sumita Mukhopadhyay, Chandan Banerjee, A.K. Barua, Accepted in Journal of Materials Science: Materials in Electronics (DOI 10.1007/s10854-014-2404-2).
6. "Silica nanoparticles on front glass for efficiency enhancement in superstrate type amorphous silicon solar cells", Sonali Das, Chandan Banerjee, Avra Kundu, Prasenjit Dey, Hiranmay Saha, Swapan K. Datta, Journal of Physics D: Applied Physics, 46 (2013).
7. "Tapered Silicon Nanopillars for enhanced performance thin film solar cells", Avra Kundu, Sonali Das, S. M. Hossain, Swapan K. Datta, Hiranmay Saha- Energy Procedia 54 (2014)389.
8. "Modelling and simulation-based performance study of a transformerless single-stage grid-connected photovoltaic system in Indian ambient conditions" A. Datta, G. Bhattacharya, D. Mukherjee, and H. Saha, International journal of Ambient energy, 2014, Taylor and Francis,(in press)
9. "Selection of islanding detection methods based on multi-criteria decision analysis for grid-connected photovoltaic system applications", A. Datta, G. Bhattacharya, D. Mukherjee, and H. Saha, Sustainable Energy Technologies and Assessment, 2014, Elsevier,(in press)
10. "Towards constant load voltage in Indian grid connected PV system using dsPIC controlled power conditioning unit," A. Datta, G. Bhattacharya, D. Mukherjee, and H. Saha, Procedia Technology 4 (2012) 661 – 665
11. "Application of supercapacitor to power small electronic appliances", M Das, I.Das, N.K.Bhattacharyya, D.Mukherjee, H.Saha, IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE), 4 (2013) 28-32.
12. "Cathodic and anodic deposition of FeS<sub>2</sub> thin films and their application in electrochemical reduction and amperometric sensing of H<sub>2</sub>O<sub>2</sub>", Biswajit Chakraborty, Bibhutibhushan Show, Sumanta Jana, Bibhas Chandra Mitra, Swarup Kumar Maji, Bibhutoh Adhikary, Nillohit Mukherjee, Anup Mondal-Electrochimica Acta. 7 (2013) 94.
13. "Photocatalytic degradation of organic dye on porous iron sulfide film surface", Sanjib Kumar Bhar, Sumanta Jana, Anup Mondal, Nillohit Mukherjee, Journal of Colloid and Interface Science 286 (2013) 393.
14. "A study on nanoindentation and tribological behaviour of multifunctional ZnO/PMMA nanocomposite", Himel Chakraborty, Arijit Sinha, Nillohit Mukherjee, Dipa Ray, Partha Protim Chattopadhyay, Materials Letters, 93 (2013) 137.
15. "Design of high efficiency solar cells with lossless nanoentities atop and embedded in silicon substrate", Sonali Das, Avra Kundu, Hiranmay Saha, Swapan K. Datta- Journal of Optics, 15 (2013) 105006.

16. "Effect of embedding silica nanoparticles and voids in the performance of c- Si solar cells", Sonali Das, Avra Kundu, Hiranmay Saha, Swapan K. Datta, *Journal of Renewable and Sustainable Energy*, 5 (2013) 031603-1-031603-11.
17. "Indentation and scratch behavior of functionalized MWCNT–PMMA composites at the micro/nanoscale", H Chakraborty, A Sinha, N Mukherjee, D Ray, P Protim Chattopadhyay, *Polymer Composites* 35 (5) (2014) 948.
18. "Effect of annealing temperature on the morphology and sensitivity of the zinc oxide nanorods based methane sensor", B Mondal, C RoyChoudhury, H Saha, N Mukherjee, *Acta Metallurgica Sinica (English Letters)* 27 (4), (2014) 593.
19. "Enhanced optical absorption and electrical performance of silicon solar cells due to embedding of dielectric nanoparticles and voids in the active absorber region", Sonali Das, Avra Kundu, Hiranmay Saha, Swapan K. Datta-*Journal of Modern Optics*. [http://dx.doi.org/10.1080/09500340.\(2013\).796015](http://dx.doi.org/10.1080/09500340.(2013).796015).
20. "A Review on Amperometric Type Immunosensors Based on Screen-Printed Electrodes" , Kalyan Kumar Mistry, Keya Layek, Abhijit Mahapatra, Chirasree RoyChaudhuri and Hiranmay Saha-*Analyst* (This journal is © The Royal Society of Chemistry). DOI:10.1039/C3AN02050A( accepted for publication), (2014).
21. "Zinc oxide nanorods based methane sensor: facile chemical synthesis and annealing optimization", Biplob Mondal, Lachit Dutta, Chirasree Roychaudhury, Dambarudhar Mohanta, Nillohit Mukherjee, Hiranmay Saha- *Sensors & Actuators: B. Chemical* (Accepted for pub)(2014).
22. "Palladium-silver activated ZnO surface: highly selective methane sensor at reasonably low operating temperature", Sugato Ghosh, Chirasree RoyChaudhuri, Raghunath Bhattacharya, Hiranmay Saha, Nillohit Mukherjee, *ACS Applied Materials & Interfaces* ACS applied materials & interfaces 6 (6), (2014) 3879.
23. "An Efficient Technique for Controlling Power Flow in a Single-Stage Grid-Connected Photovoltaic System", A. Datta, G. Bhattacharya, D. Mukherjee and H. Saha, *Scientia Iranica Transactions D: Electrical Engineering* (Accepted, in-press).(2014).
24. "Large-Area Crystalline Silicon Solar Cell Using Novel Antireflective Nanoabsorber Texturing Surface Cathode Plasma System and Spin-On Doping", Multihollow- *ISRN Renewable Energy*, p1-6.
25. "Electrodeposited polymer encapsulated nickel sulphide thin films: frequency switching material", S Jana, N Mukherjee, B Chakraborty, BC Mitra, A Mondal- *Applied Surface Science* 300 (2014) 154.
26. "ZnO-SnO<sub>2</sub> based composite type gas sensor for selective hydrogen sensing", B Mondal, B Basumatary, J Das, C Roychaudhury, H Saha, N Mukherjee-*Sensors and Actuators B: Chemical*, 194 (2014) 389.
27. "A comparative study on the cold field electron emission properties of cubic nanocrystalline lead chalcogenide thin films", N Mukherjee, H Chakraborty, SF Ahmed, *RSC Advances* 4 (2014) 5312.
28. Electrochemical synthesis of p-CuO thin films and development of a p-CuO/n-ZnO heterojunction and its application as a selective gas sensor, A Ghosh, BB Show, S

Ghosh, N Mukherjee, G Bhattacharya, SK Datta, ... RSC Advances 4 (93) (2014) 51569.

29. "Electrochemical synthesis of p-CuO thin films and development of a p-CuO/n-ZnO thin film hetero-contact for gas sensing", A. Ghosh, B.B. Show, N. Mukherjee, S.K. Datta, G. Bhattacharya, A Mondal, Physics of Semiconductor Devices, (2014) 433.
30. "A comparative study on the cold field electron emission properties of cubic nanocrystalline lead chalcogenide thin films", N Mukherjee, H Chakraborty, SF Ahmed, RSC Advances 4 (11) (2014) 5312.
31. "An analytical study on daily solar radiation data", Indira Karakoti, Prasun Kumar Das and B. Bandyopadhyay, Current Science, 105, (2013) 215.
32. "Estimation of solar radiation using a combination of Hidden Markov Model and generalized Fuzzy model", Saurabh Bhardwaj, Vikrant Sharma, Smriti Srivastava, O.S. Sastry, J.R.P. Gupta, B. Bandyopadhyay, S.S. Chandel, Solar Energy 93 (2013) 43.
33. Renewables are no longer backbenchers: Guest editorial, Monthly Economic Review (Indian Chamber of Commerce) May 2014.

### Conference Publications

1. "Improvement of efficiency for the single junction a-Si solar cell by using n- $\mu$ c-Si:H layer as bottom n-layer", Gourav Das, Sourav Mandal, Rajive Tomy M, Chandan Banerjee, Sumita Mukhopadhyay and A.K.Barua, presented in 20th West Bengal State Science and Technology Congress - 2013, BESU, Shibpur, Howrah, February 25 – March 2, 2013.
2. "Development of n- $\mu$ c-SiO:H as a back reflector and its application to Amorphous Silicon Solar Cells", T. Srikanth, U. P. Basavaraju, Rajive Tomy M, M. G. Sreenivasan, Chandan Banerjee, K. Mohanchandran, Sumita Mukhopadhyay, A. K. Barua, Presented in 28th European Photovoltaic Solar Energy Conference and Exhibition, Paris, France, September 30 – October 4, 2013.
3. "Tapered Silicon Nanopillars for enhanced performance thin film solar cells", Avra Kundu, Sonali Das, S. M. Hossain, Swapan K. Datta, Hiranmay Saha, 4<sup>th</sup> International Conference on Advances in Energy Research (ICAER), IIT Bombay, Mumbai, Dec 2013.
4. "Front surface glass texturization for improved performance of amorphous silicon solar cell", Sonali Das, Avra Kundu, Chandan Banerjee, Prasenjit Dey, Swapan K. Datta, Hiranmay Saha, 17<sup>th</sup> International Workshop on The Physics of Semiconductor Devices (IWPSD), Amity University, Uttar Pradesh, Dec 2013.
5. Silicon Heterojunction Solar Cells with novel Fluorinated n-type Nanocrystalline Silicon Oxide Emitters on p-type c-Si: Sukanta Dhar, Sourav Mandal, Gourab Das, Chandan Banerjee, Sumita Mukhopadhyay, A. K. Barua: Accepted for presentation in



6<sup>th</sup> World Conference on Photovoltaic Energy Conversion, Kyoto, Japan, 23<sup>rd</sup> November – 27<sup>th</sup> November' 2014.

6. Texturization of Al:ZnO Glass Substrate by Reactive ion Etching and its application to Single junction a-Si Solar cells: Gourab Das, Sourav Mandal, Sukanta Dhar, Sukanta Bose, Arpita Jana, Sumita Mukhopadhyay, Chandan Banerjee, A.K.Barua: Accepted for presentation in 6<sup>th</sup> World Conference on Photovoltaic Energy Conversion, Kyoto, Japan, 23<sup>rd</sup> November – 27<sup>th</sup> November' 2014.

7. "Tapered Silicon Nanopillars for enhanced performance thin film solar cells", Avra Kundu, Sonali Das, S. M. Hossain, Swapan K. Datta, Hiranmay Saha, 4<sup>th</sup> International Conference on Advances in Energy Research (ICAER), IIT Bombay, Mumbai, Dec 2013.

8. "A portable sensitive LPG / methane gas measuring unit", S. Ghosh, S. Dey, I. Das, H. Saha, presented in 20<sup>th</sup> West Bengal State Science and Technology Congress - 2013, BESU, Shibpur, Howrah, February 25 – March 2, 2013.

9. "Nanoparticles for high efficiency silicon solar cells: Status and Prospects", Sonali Das, Santanu Maity, Prasenjit Dey, Avra Kundu, Nillohit Mukherjee, Swapan K. Datta and Hiranmay Saha, presented at 20<sup>th</sup> West Bengal State Science and Technology Congress - 2013, BESU, Shibpur, Howrah, February 25 – March 2, 2013.

10. "Nanotexturing of silicon surfaces for solar cell applications", Santanu Maity, Sonali Das, Avra Kundu. Swapan K. Datta and Hiranmay Saha, presented at 20<sup>th</sup> West Bengal State Science and Technology Congress - 2013, BESU, Shibpur, Howrah, February 25 – March 2, 2013.

1. "Radial junction si-nanowire for photovoltaic applications", Saptaparna Dey, Sonali Das , Avra Kundu , Swapan K. Datta and H.Saha, presented in 20<sup>th</sup> West Bengal State Science and Technology Congress - 2013, BESU, Shibpur, Howrah, February 25 – March 2, 2013.

2. "A comparative study on the optical properties of Ag and Au nanoparticles deposited by chemical, electrochemical and physical techniques", Sudarshana Banerjee, Sonali Das, Avra Kundu, Swapan K. Datta, Hiranmay Saha and Nillohit Mukherjee, presented in 20<sup>th</sup> West Bengal State Science and Technology Congress - 2013, BESU, Shibpur, Howrah, February 25 – March 2, 2013.

3. "Mixture of metal and dielectric nanoparticles for improved performance of silicon solar cell", Sonali Das, Prasenjit Dey, Avra Kundu, S. M. Hossain, Swapan K. Datta, Hiranmay Saha, 4<sup>th</sup> International Conference on Advances in Energy Research (ICAER), IIT Bombay, Mumbai, Dec 2013.

4. "Front surface glass texturization for improved performance of amorphous silicon solar cell", Sonali Das, Avra Kundu, Chandan Banerjee, Prasenjit Dey, Swapan K. Datta, Hiranmay Saha, 17<sup>th</sup> International Workshop on The Physics of Semiconductor Devices (IWPSD), Amity University, Uttar Pradesh, Dec 2013.

5. "Highly selective and stable methane sensor at reasonably low operating temperature", Sugato Ghosh, Shalini Choudhury, Chirosree RoyChaudhuri, Raghunath Bhattacharyya, Hiranmay Saha and Nillohit Mukherjee, In 'National Seminar on Thin Film and MEMS Science & Technology (NSTF & MT-14), Jadavpur University, Kolkata, March 21-22, 2014, Accepted.

6. “Effect of size on the scattering properties of silica nanoparticles”, Sonali Das, Avra Kundu, S. M. Hossain, Hiranmay Saha, Swapan K. Datta, 2nd International Conference on Emerging Electronics (ICEE), IISc Bangalore, Bangalore, Dec 2014.

**Patents / Invention Disclosure / Technology Transfer / Copyright**

- [1] Fabrication of n-type microcrystalline silicon oxide films for use as back reflectors in silicon based thin film solar cells. [File No.: 1347/CHE/2013, Mar. 26, 2013]
- [2] Fabrication of fluorinated n-type silicon oxide films for intermediate and back reflector in thin film solar cells. [File No.: 3947/CHE/2013, Sep. 03, 2013]

**Seminar / Workshops / Conferences / Training programme organized by the department (2013 - 14)**

- (a) Two day Workshop on Roof Top Solar PV Power Plant, sponsored by Dept of Power, Govt of West Bengal, 7-8 Feb, 2014
- (b) Three Weeks Summer Training on Solar PV and Solar Thermal Engineering, for Engineering Students, 15 June- 7<sup>th</sup> July, 2014

**Technology Developed / Innovations:**

- (i) 3"x3" crystalline silicon solar cells with approx 15% efficiency and its efficiency enhancement through plasmonic nano materials on front surface
- (ii) P-i-n amorphous silicon solar cells of 8-9 % efficiency and its efficiency enhancement through plasmonic nano materials on front / back surface
- (iii) Mobile Turbo Charger With Super Capacitor
- (iv) Solar Tree with LED lighting
- (v) Data logging and Monitoring Unit for Solar Power Plants
- (vi) Gas Leak Hunter
- (vii) Prototype for Manhole Gas Detector

**Advancements under TEQIP – Phase II : Not included in TEQIP - Phase II**

**Foreign visits and Invited Lectures:**

**Dr. Bibek Bandopadhyay**

**Invited talk:**

1. Prospects and Challenges of Solar Power in India: Lecture series on 'Sustainability of Indian Energy Sector: Prospects and Challenges', Jadavpur University, October 2013.
2. Energy System Modelling and Optimization Conference (ESMOC 2013), Durgapur, December, 2013.

3. Solar Resource Assessment: 'Design of Concentrated Solar Thermal Systems: International Centre for application of Solar Energy Technologies', Indian Institute of Technology Jodhpur, December 2013.
4. Solar resource and its measurement: National Institute of Solar Energy, January, 2014.
5. Rooftop Solar PV program in India: Legislation, regulation and interaction: Workshop on Promotion of Rooftop Solar PV System in the State of West Bengal, IEST, February, 2014.
6. Invited talk: Energy Needs in India 2030: 2<sup>nd</sup> Industry – University International Conference on Supply Chain Management, Ansal Institute of Technology and Management Lucknow, and Clemson University, USA, February 2014.
7. Increasing share of renewable energy, National Workshop on Challenges in Realization of Solar and Biomass Resources Vellore Institute of Technology: Vellore, March 2014.
8. Challenges and realization of Renewable Power in India: CHEM Bridge National Symposium, Jadavpur University March 2014.
9. Share of renewables in India energy scenario 2030: National Conference on Nanotechnology and Renewable Energy, April, 2014.
10. Speaker in the Web Seminar: Role of Energy Storage Technologies for Renewable Energy Deployment in India: USAID PACE D, May, 2014
11. Why rooftop solar- key advantages, potential for India and the global experience in the development of rooftop solar: Workshop on Large Commercial and Industrial Consumers for development of the Rooftop Solar PV Projects, USAID-KREDEL, Bangalore, August, 2014.
12. Guest lecture: Solar resource and its assessment: Indian Institute of Technology Jodhpur, August, 2014.
13. Emerging energy technologies-Solar Energy: Amity University Haryana, August, 2014.
14. Off-grid Markets-The solar + LED combine is opening up markets that never existed before: Conference in Business of Lighting, New Delhi, September, 2014.

### **Prof. S K. Dutta**

#### **Invited Talks**

1. "Enhancement of Performance of Crystalline And Amorphous Silicon Solar Cells through Optical Engineering by Nanostructured Materials", 4<sup>th</sup> December 2013 at IWPSD
2. "SOLAR PHOTOVOLTAICS : Current status and Future prospects" March 2014 at NITMAS
3. "Fabrication and Characterization of High Efficiency Crystalline Silicon Solar Cells and its efficiency Enhancement by metallic and dielectric Nano structures", 28 June 2014 at KIIT, Bhubaneswar.
4. "Solar Energy: Prospects and challenges", 19th August 2014 at Lady Brabourne College.

### **Chandan Banerjee**

Attended 28th EUPVSEC at Paris, 30<sup>th</sup> Sep – 4<sup>th</sup> Oct, 2013 for presenting the below mention paper

[1] Development of n- $\mu$ c-SiO:H as a back reflector and its application to Amorphous Silicon Solar Cells: T. Srikanth, U. Basavaraju, Rajive Tomy M, M. G. Sreenivasan, Chandan Banerjee, K. Mohanchandran, Sumita Mukhopadhyay, A. K. Barua: Proceedings of 28th European Photovoltaic Solar Energy Conference, Paris, France, 30<sup>th</sup> Sep – 4<sup>th</sup> Oct, 2013, pp 2475-2477.

**Visitors to your Department ( Indian & Foreign):**

Dr. Anil Kakodkar

Dr. Subhendu Guha

Dr. Vikram Kumar

Prof E S Raja Gopal

and many others

**Academic Collaboration:**

(i) SSN Institute , Chennai

(ii) IIT, KGP

(iii) KIIT, Bhubaneswar

(iv) IIIT, Ahmedabad

(v) IACS, Kolkat

(vi) Jadavpur University

(vii) MSIT College

(viii)ISM, Dhanbad

**Industrial Collaboration :**

(a) Sova Power Limited , Durgapur

(b) Agni Power Pvt limited, Kolkata

(c) Synchro Electronics , kolkata

(d) Oztron Energy Systems, Australia

(e) Hind HiVac Ltd, Bangalore



***Centre for Healthcare Science &  
Technology***



**About the Department:** The Centre for Healthcare Science and Technology (CHST) was established by the erstwhile Bengal Engineering and Science University, Shibpur on 22.01.2010.

### **Academic Programme**

#### **Undergraduate Level**

Degree offered

: A Proposal to offer UG course from a new department is prepared and will be placed to the Senate to be formed for its approval. If it allows, the course will start from 2015-16.

Sanctioned students' intake : --

Additional intake through lateral entry in 3<sup>rd</sup> Semester: --

#### **Post Graduate Level**

Degree offered : Proposed to start from 2015-16

Sanctioned students' intake : --

Additional intake through other programmes (i.e. QIP) : --

Specialisations in : --

#### **Doctoral & Post Doctoral Research Programme**

Degree offered : PhD (Engineering)

No of Candidates enrolled : **07**

**Faculty Position: All positions are of limited tenure**

| Name                             | Designation  | Highest Qualification | Specialization/ Research Area                    | Contact No. E-mail   |
|----------------------------------|--|-----------------------|--|--|
| Prof Ashoke Sutradhar            | Professor of EE & Head   | PhD                   | Control System, Instrumentation, System Modeling | asee1@rediffmail.com   |
| Prof. Jayanta Chakraborty        | Adjunct Professor  | PhD                   | Applied Mechanics, Biomechanics                  | jayantakrchakraborty@yahoo.com   |
| Dr. Chitrangada Das Mukhopadhyay | Asst. Prof. (contractual)  | PhD                   | Biotechnology, Clinical Microbiology             | <a href="mailto:chitrangadadas@yahoo.com">chitrangadadas@yahoo.com</a> |
| Dr. Ananya Barui                 | Asst. Prof. (contractual)  | PhD                   | Stem Cells, Cancer and Regeneration              | 9733388223<br>ananya.pariksha@gmail.com                                |
| Dr. Pallab Datta                 | Asst. Prof. (under DST INSPIRE faculty award [IFA12-LSBM-48 dated 01/02/2013]) | PhD                   | Biomaterials, Biofabrication, Drug Delivery      | 9474892494<br>contactpallab@gmail.com                                  |

**There are permanent faculty members from various other departments associated with this Center of interdisciplinary research work.**

### **Awards and Laurels:**

Young Scientist Award to Dr Ananya Barui, 2013  
DST-INSPIRE Fellowship by Dr Pallab Dutta, 2013



**Research Areas (only mention broad titles without description in details):**

1. Cardiac Instrumentation
2. Cancer Biology, Bioinformatics, Drug resistance
3. Biomaterials, Bio-fabrication, Drug Delivery
4. Stem Cells, Cancer and Regeneration
5. Bio-Sensors
6. Bio-mechanics

**Research Facilities: (name specific equipment/ picture etc.)**

1. Analytical balances
2. Multi-parameter Meter,
3. -20 degree freezer,
4. Freeze Dryer
5. Nikon Epi-fluorescent Microscope,
6. Laboratory Centrifuges,
7. Hot Air Ovens,
8. Bio-safety Cabinet
9. Electro-spinning Equipment,
10. Lyophilizer,
11. AD Instruments Powerlab 8 port system & Lab Chart pro software CD
12. BPL Ultima Prime BS Cardiac monitor

See Annexure – I for Pictures of some Equipments

**Name of the laboratories:**

Biomaterials Laboratory

Cardio-pulmonary Instrumentation laboratory

Clinical Microbiology- Biochemistry- Biotechnology Laboratory

Computer Laboratory

Stem Cell Regeneration and Early Cancer Imaging Laboratory

**Support staff position:**

- (a) (i) Sanctioned technical post : **NIL**  
(ii) Technical staff profile (in the following table):

| Name               | Designation                              | Highest Qualification | Status                                | E-mail |
|--------------------|--|-----------------------|---------------------------------------|--------|
| Pratap Chandra Ari | Medical Technician<br>(from DST Project) | DMRT, DMET, B. Com    | Temporary from Project Till Sept 2014 |        |
| Aritra Mahapatra   | SRF<br>(from DST Project)                | M.Tech. (IT)          | Temporary from Project Till Sept 2014 |        |
| Ripon Sarkar       | JRF (DST Fast Track Project)             | M.Sc. (Microb)        | Temporary from Project                |        |

**Ongoing Sponsored Research / Projects : (mention area)**

| <b>Ongoing (Project Value)</b>  | <b>Sponsoring agency</b>  |
|---|---------------------------|
| Fabrication of Bio-degradable Honey Based Scaffold for Ex-Vivo Expansion and differentiation of Mesenchymal Stem Cells (21.45 Lakhs)<br><br>PI: Dr. Ananya Barui  | DST (Fast Track)          |
| Biofabrication of Bioactive Scaffolds for Bone Regeneration. (35 Lakhs)<br><br>PI: Dr. Pallab Datta   | DST (INSPIRE)             |
| Biofabrication with functionalizable poly (amino acid) hydrogels towards development of bioengineered tissue constructs and biocompatible medical devices (24.60Lakhs)<br><br>PI: Dr. Pallab Datta                                  | DST (Fast Track)          |
| Enzymatic approach to control celiac disease leading to an alternative treatment strategy (20 Lakhs for the 1 <sup>st</sup> yr)<br><br>Co-PI: Chitragada das Mukhopadhyay   | DBT, Govt of India        |
| Development of Smart Prognostic System for Early Indication of Cardiac Problem of a Patient:<br><br>PI: Prof. Ajoy Kumar Ray (37.425 Lacs)  | DST-IDP<br>Govt. of India |
| Computed Aided Design, Analysis and Development of Patient Specific Prosthesis for Different Human Joints, Specifically Hip Joint on Indian Perspective;<br><br>PI: Prof. Amit Roy Chowdhary, (63.148 Lacs)                         | DBT, Govt. of India       |
| Efficacy of Silicon Microchannel Cytosensor Platform for Electrical Profiling of Multiple Mammalian Cells Under Intervention Towards Diagnostic and Regenerative Applications;<br><br>PI: Dr. Chirasree RoyChowdhuri, (54.600 Lacs) | SERB, Govt. of India      |

**No. of Publications: (This year only)**

a)        **Journal**                        :        **10**

b)        **Conference**        :        **15**

See Annexure – II for the List of Publications

**Books / Monographs ... 1**

1. **Chitrangada Das Mukhopadhyay** (2014) Engineering *Spirulina* for Enhanced Medicinal Application In Das D. (Ed) Algal Biorefinery: an integrated approach, Capital Publishing – Springer (Accepted).

#### **Seminar / Workshops / Conferences / Training program organized by the department (2013 - 14)**

1. One-Day Workshop on “*Advances in Scientific & Technological Research in Traditional Medicine*”, jointly organized by AYUSH, Govt. of India and CHST, BESU held on 26th July 2013.
2. One day Workshop on “*Infrastructure Requirements for Implementing Research Hospital Facilities at BESU*” on 05<sup>th</sup> August 2013.
3. One day Workshop on “*Interactive Session for Collaborative Research in Engineering and Biomedical Sciences between BESU and Rhine-Waal University of Applied Sciences, Germany*” held at BESU on 25<sup>th</sup> October 2013.
4. International Seminar on “*Technological Advances in Healthcare*” (TAH-2013) 5-6 Dec 2013.
5. Seminar on “*Innovative Medical Systems*”, 6<sup>th</sup> February, 2014

#### **Technology Developed / Innovations :**

##### Ongoing work on:

- Portable cardiac risk detector – sponsored by Dept. of Science & Technology, Govt. of India
- Multifunction electronic blood pressure machine,
- Computerised auto-analysis of paper-based archived ECG
- Work on clinical Microbiology specially to address drug resistant bacterial strains
- Combinatorial therapy for celiac diseases
- Prototypes developed
  - i) Portable electrical biosensor for bacteria detection
  - ii) Wireless sensor system for health monitoring of elderly people (field testing has started)

#### **Foreign visits and Invited Lectures**

**Dr. Pallab Datta**, INSPIRE faculty member of the Center has visited the Intelligent Manufacturing Systems Lab, Department of Mechanical Engineering, Pohang Institute of Science and Technology, Pohang, South Korea and presented his research paper there at International Conference on Biofabrication 2014.

**Chitrangada Das Mukhopadhyay**, Asst. Professor gave invited Lecture in the National seminar on “**Bridging The Gap Between Engineering And Medical Science**”, during 15<sup>th</sup> - 16<sup>th</sup> June , 2013.

#### **Visitors to your Department ( Indian & Foreign)**

1. Prof. Stefen Leonhardt, Philips Chair for Medical Infor. Tech., RWTH Aachen University.
2. Prof. T. Lazar Mathew, Advisor PSG Institute of Advanced Studies Coimbatore
3. Prof Jayesh Bellare, Professor, Chemical Engineering , IIT Bombay

4. Prof Alok Ray, CBME, IIT Delhi
5. Prof Soumya Mukherji, Department of Biosciences and Bioengineering, IIT Bombay
6. Prof G K Ananthasuresh, **Mechanical Engineering**, IISc, Bangalore
7. Dr. Pankaj Rupauliha, Consultant Ophthalmologist, RTIICS NH, Kolkata
8. Prof Himadri Chakrabarty, Mechanical Engg., Jadavpur University
9. Mr. N. Sanyal, Secretary, AYUSH, Govt. of India
10. Dr. R. K. Manchanda, Director General, CCRH, India.
11. Dr. Manoj Neshari, Dy Advisor AYUSH, Govt. of India.
12. Dr. Jayram Hazra, NRIADD , Kolkata
13. Dr. Prabhash Banerjee, Adjunct Prof. S.M.S.T., IIT , Kharagpur
14. Dr. Rathin Chakraborty, Dr. Bholanath Chakravarty Memorial Trust.
15. Dr. Bhaswati Banerjee, Assoc. Prof, Microbiology; School of Tropical Medicine, Kolkata
16. Prof. G. S. Sa, Bose Institute, Kolkata
17. Prof. Papiya Nandy, Em. Fellow, Physics, Jadavpur University
18. Dr. Anil D'Cruz, Director, Tata Memorial Hospital, Mumbai
19. Prof. Partha P. Majumder, Director, National Institute of Biomedical Genomics, Kalyani
20. Dr. Surajit Dhara, National Institute of Biomedical Genomics, Kalyani
21. Dr. Jyotirmoy Chatterjee, School of Medical Science and Technology, IIT Kgp.
22. Prof. Bidyut Roy, Human Genetic Unit, Indian Statistical Institute, Kolkata
23. Prof. R. R. Paul, Principal, Guru Nanak Institute of Dental Science & Research, Kolkata
24. Dr. Jui Chakraborty, CSIR-CG&CRI, Kolkata
25. Dr. Abhijit Chaudhury, Head, Dept of Gastroenterology, SSKM Hosp & IPGMER, Kolkata.
26. Dr. Parthasarathi Bhattacharjee, Institute of Pulmo-care, Salt Lake, Kolkata
27. Prof. Peter F.W. Simon, R-W University, Germany
28. Prof. Irmgard Buder, R-W University, Germany
29. Prof. Alexander Struck, R-W University, Germany
30. Prof. Peter Scholz, R-W University, Germany
31. Prof Neil Shirtcliffe, R-W University, Germany
32. Prof. Dr.-Ing. Sandro Leuchter, R-W University, Germany
33. Prof. Neu Bjorn, R-W University, Germany
34. Prof. Marie-Louise Klotz, R-W University, Germany
35. Prof Matthias Kleinke, R-W University, Germany
36. Prof Joachim Fensterle, R-W University, Germany

### **New Academic / Research Initiatives**

A proposal for offering the UG and PG/ 5 years integrated dual degree course in **Biomedical Science and Engineering** has been prepared. For this, a new department (Dept. of Biomedical Science and Engineering) will be formed. One draft proposal for this has been submitted to the Director, IEST as per his instruction. Once the Senate and the Governing body of the institute are formed, the proposal will be formally placed to these statutory bodies for their approval. If everything goes right and necessary infrastructure is built, we may start the new course from the new department from the next academic session i.e. 2015-16. The center will then look after the interdisciplinary R&D work under the umbrella of this new department.

### **Collaborative research work with Educational and R&D Institutes:**

Central Glass & Ceramic Research Institute Kolkata, IIT Kharagpur, Jadavpur University, Calcutta University and Variable Energy Cyclotron Centre, Kolkata.

**ANNEXURE – I: PICTURES OF SOME OF THE LABORATORY INSTRUMENTS.**



**ANALYTICAL BALANCES, MULTIPARAMETER METERS ETC.**



**-20<sup>0</sup> FREEZER**



**FREEZE DRYER**



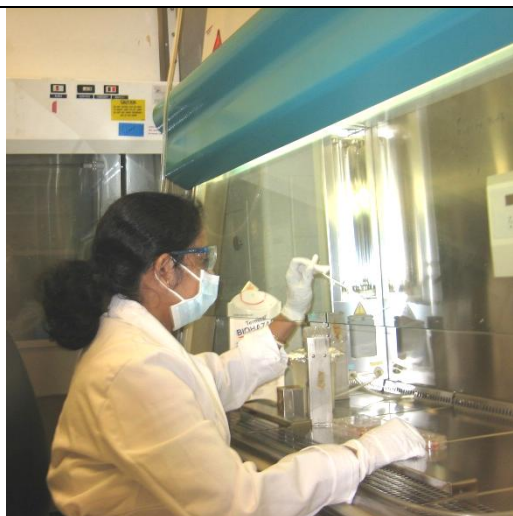
**NIKON EPIFLUORESCENT MICROSCOPE**



**LABORATORY CENTRIFUGES**



**AUTOClave, HOT AIR OVENS**



**BIOSAFETY CABINET**



**ELECTROSPINNING APPARATUS**

## ANNEXURE – II : LIST OF PUBLICATIONS:

### Journal Publications.

1. Ajit Kumar Mahapatra, Saikat Kumar Manna, Kalipada Maiti, Rajkishor Maji, **Chitrangada Das Mukhopadhyay**, Deblina Sarkar and Tapan Kumar Mondal (2014) “Imino–phenolic–azodye appended rhodamine as a primary fluorescence “off–on” chemosensor for tin ( $\text{Sn}^{4+}$ ) in solution and in RAW cells and the recognition of sulphide by [AR–Sn]” - *RSC Adv.*, July, Vol4, 36615-36622.
2. Ajit Kumar Mahapatra, Kalipada Maiti, Saikat Kumar Manna, Rajkishor Maji, **Chitrangada Das Mukhopadhyay**, Bholanath Pakhira, and Sabyasachi Sarkar – “Unique Fluorogenic Ratiometric Fluorescent Chemodosimeter for Rapid Sensing of CN<sup>-</sup> in Water” *Chem.Asian.J* DOI: 10.1002/asia.201402923. Published online September, 2014
3. Vanda J Lisnic, Marina B Cac, B Lisnic, **C Das Mukhopadhyay**, Charles H. Cook, Stipan Jonjic and Joanne Trgovcich, “Dual Analysis of the Murine Cytomegalovirus and Host Cell Transcriptomes Reveal New Aspects of the Virus-Host Cell Interface” (2013) *PLoS Pathogen* 9(9): e1003611. doi:10.1371/journal.ppat.1003611 published online on 25<sup>th</sup> Sept
4. Ajit Kumar Mahapatra, Saikat Kumar Manna, **C. Das Mukhopadhyay** and Debasish Mandal (2014) “Pyrophosphate-selective fluorescent chemosensor based on ratiometric tripodal-Zn(II) complex: Application in logic gates and living cells” *Sensors and Actuators B: Chemical*, Sep 2014, 200, 123-131
5. Mahapatra A., Manna, S; Mandal D; **Das Mukhopadhyay C.** (2013) “A Highly Sensitive and Selective Rhodamine-based “Off–On” Reversible Chemosensor for Tin ( $\text{Sn}^{4+}$ ) and Imaging in Living Cells” *Inorg. Chem* , Vol: 52, Issue 19, pp 10825–10834, DOI: 10.1021/ic4007026
6. Mahapatra A. K., Maji R, Adhikari S. S., **Das Mukhopadhyay C.** and Mandal D. (2013) “Ratiometric sensing of fluoride and acetate anions based on a BODIPY-azaindole platform and its application to living cell imaging”- *Analyst*, 2013, DOI: 10.1039/C3AN01663C
7. S P Goswami, Sangita Das, Krishnendu Aich, **Chitrangada Das Mukhopadhyay**, Debolina Sarkar (2014) “A new visible light excitable ICT-CHEF mediated fluorescence ‘turn on’ probe for the selective detection of  $\text{Cd}^{2+}$  in mixed aqueous system with live-cell imaging” - (2014) (Accepted) *Dalton Transactions*.
8. **A Barui**, P Banerjee, A Chaudhuri, S Conjeti, BK Mondal, S Dey, J Chatterjee, - “Evaluation of Angiogenesis in Diabetic Lower Limb Wound Healing using a natural medicine: a Quantitative Approach”, *Wound Medicine*, Volume 6, Page 26-33, 2014.
9. M Rajput, N Bhandaru, **A Barui**, A Chaudhary, RR Paul, R Mukherjee, J Chatterjee,- “Nano-patterned honey incorporated silk fibroin membranes for improving cellular compatibility”, *RSC Advances* 4 (84), 44674-44688, 2014.
10. **Pallab Datta**, Goutam Thakur, Jyotirmoy Chatterjee and Santanu Dhara, “Biofunctional phosphorylated chitosan hydrogels prepared above pH 6 and effect of Cross-linkers on gel properties towards biomedical applications”, *Soft Materials*, Vol. 6, Issue 1, Pages- 27-35, 2014.

### Conference Publications.

1. **Chitrangada Das Mukhopadhyay**, In vivo imaging of apoptotic cells by Phage display technique presented in *Indian Science Congress*, 2-5<sup>th</sup> January, 2013, Kolkata.
2. Amit Paul, **Chitrangada Das Mukhopadhyay**, Jaya sil (2014) Dimension Reduction of Gene Expression Data For Designing Optimized Rule Base Classifier, presented in *2nd International conference on Recent Advances in Information Technology (RAIT-2014)* ISM, Dhanbad, 13-15 March 2014
3. Amit Paul, **Chitrangada Das Mukhopadhyay**, Jaya Sil (2014) “Feature Filtering of Amino acid sequences Using Rough Set Theory”, presented in *ICCIDM*, Bhubaneswar, India, November 2014.
4. **Chitrangada Das Mukhopadhyay** and Joanne Trgovcich (2014) “Uncovering role of HCMV miRNAs in malignant glioma pathogenesis for targeted cancer therapy” oral presentation in 5th *International Conference on Stem Cells and Cancer (ICSCC-2014)*: Proliferation, Differentiation, and Apoptosis, New Delhi, India, November 8-10
5. **Pallab Datta**, Santanu Dhara, Jyotirmoy Chatterjee, “Engineering Porosity in Electrospun Nanofiber Sheets by Laser Engraving: A Strategy to Fabricate 3D Scaffolds For Bone Graft Applications”, *International Conference on Biofabrication*, POSTECH, South Korea, 2014.
6. Arpita Bhattacharjee and **Ashoke Sutradhar**, “Online Determination of Frequency Domain Kernels of Nonparametric Volterra Model From Type-1 Diabetics”, - *International Seminar on Technological Advances in Healthcare (TAH-2013)*, 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.31-35.
7. **C. RoyChaudhuri** and H.Ghosh, - “Noise Spectroscopy as an Efficient Tool for Impedance Based Biomolecule Detection in Complex Sample Matrices using Nanoporous Silicon Oxide”, *International Seminar on Technological Advances in Healthcare (TAH-2013)*, 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.36-38.
8. **Jayanta Kumar Chakraborty**, “Development of Lower Limb Prosthesis”, *International Seminar on Technological Advances in Healthcare (TAH-2013)*, 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.39-40.
9. **Amit Roy Chowdhury**, **Santanu Majumder**, Subhomoy Chatterjee, Jayanta Biswas, Sandipan Roy, Rururaj Pradhan, - “Application of Finite Element Method in Biomechanics”, *International Seminar on Technological Advances in Healthcare (TAH-2013)*, 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.41.
10. **Pallab Datta**, Paulomi Ghosh, Kuntal Ghosh, Pritiprasanna Maity, Sintu Kumar Samanta, Sudip Kumar Ghosh, Pradeep Kumar Das Mohapatra, Jyotirmoy Chatterjee and Santanu Dhara, - “*In Vitro* ALP and Osteocalcin Gene Expression Analysis and *In Vivo* Biocompatibility of N-Methylene Phosphonic Chitosan Nanofibers for Bone Regeneration”, - *International Seminar on Technological Advances in Healthcare (TAH-2013)*, 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.42.
11. **Ananya Barui**, Provas Banerjee, Jyotirmoy Chatterjee, - “Differential Optical Properties of Healing Wound Bed: Swept Source-Optical Coherence Tomography (SS-OCT) Observations”, *International Seminar on Technological Advances in Healthcare (TAH-2013)*, 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.43-44.
12. **Chitrangada Das Mukhopadhyay** and Joanne Trgovcich, - “Cytomegalovirus Small RNAs Identified by Next Generation Sequencing Target the Tumor Suppressor Gene in Glioblastoma” - *International Seminar on Technological Advances in Healthcare (TAH-2013)*, 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.45-46.

13. Ajit Kumar Mahapatra , Saikat Kumar Manna and **Chitragada Das Mukhopadhyay**, - “New Strategies for Fluorescent Probe Design in Biological Imaging”, *International Seminar on Technological Advances in Healthcare* (TAH-2013), 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.47-48.
14. Amit Paul, **Chitragada Das Mukhopadhyay** and Jaya Sil, - “Knowledge Mining of Human Cancer based on Network Biology”, *International Seminar on Technological Advances in Healthcare* (TAH-2013), 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.49-50.
15. **Jayati Bhowal**, “Technology Developments for Preparation of Low Cost Non-Dairy Food Products Enriched in Health-Benefit Ingredients”, *International Seminar on Technological Advances in Healthcare* (TAH-2013), 5-6 December, 2013 organized by CHST, BESU Shibpur, pp.51-53.





*Central Library*



## **Preamble**

The University library has the distinction of being one of the oldest and largest resourceful technical libraries in the eastern India. The library not only caters to the basic information needs of faculty members, research scholars and students of this University but also provides information and documentation services to researchers of neighbouring engineering colleges, universities and research institutes. The library provides open access services for books and journals to its members including students.

## **Collection**

The total collection of books is 1,39,601 as on 31<sup>st</sup> March 2014. During this period the library procured 2,347 books worth ₹ 70.00 lakhs recommended by the faculty members, research scholars and students of the university with the aim of augmenting the overall collection of the library. It has a huge collection of non-book materials, such as patents, standards, technical reports and pamphlets. The library boasts of having a good collection of old and rare books and journals of the nineteenth century.

## **Computerization**

The library has already computerized its entire library housekeeping operations and services. The preparation of database of the library collection for books has been completed and charging and discharging of books to the members are made online through the integrated library management system – LibSys. The library is providing online search facilities (WebOPAC) of its database through the website of the university for benefit of its users. The library already introduced system generated bar-coded membership card with photograph of the member.

## **Services offered**

- Access to electronic resources
- Lending facilities
- Reading Room facilities
- Reference Services
- Digital Question Papers Access Services
- Inter Library Co-operation
- Internet searching/web browsing
- Services to Alumni and other distinguished visitors

## **Electronic Resources**

The facilities in the Library have been significantly improved by the way of introducing new scholarly electronic resources. The access of e-resources – *ASCE Journals*, *ASME Journals* and *IEL Online* (5 simultaneous user) available through the INDEST-AICTE consortium and *American Chemical Society (ACS)*, *American Institute of Physics (AIP)*, *American Physical Society (APS)*, *Royal Society of Chemistry (RSC)*, *Springer's LINK*, *T&F Journals*, *JSTOR* and *Economic and Political Weekly* database through the UGC INFONET Digital Library consortium is continued. The subscription of seven subject collections (namely, Chemistry; Computer Science; Earth and Planetary Sciences; Engineering; Physics and Astronomy; Materials Science; and Mathematics) of Elsevier's *Science Direct* database is also continued. Like previous year, the library is also subscribing management science database, *EBSCO Business Suite Plus*.

## **Awards**

Dr. Susmita Chakraborty, Assistant Librarian has awarded Bonnie Hilditch International Librarian Award in the Annual Program of Special Libraries Association, held at San Diego, USA during June 7-12, 2013.

## **Seminars/Refresher courses**

Dr. H.P. Sharma, Deputy Librarian has acted as one of the panelists of Technical Session IV in the DEC Sponsored National Workshop in Library and Information Science, held at Netaji Subhas Open University, Kolkata during May 10-11, 2013 and delivered a lecture on Information Sources and Services.

Dr. Susmita Chakraborty, Assistant Librarian has attended the 79<sup>th</sup> World Library and Information Congress, held in Singapore during August 17-24, 2013 and presented a paper titled 'Going green or not: realities of the Indian Metropolis Libraries'.

Dr. H.P. Sharma, Deputy Librarian has acted as a resource person in the 10<sup>th</sup> UGC Refresher Course in Library and Information Science on academic library management: infinite possibilities, organized by the Academic Staff College, University of Calcutta during September 6-27, 2013 and delivered a lecture titled 'Recent trends in academic library management: changes and conflict'.

Sri Sushil Kumar Barman, Assistant Librarian has attended the National Workshop on Web-scale Discovery Services: Transforming Access to Library e-resources, held at Indian Institute of Technology, Kharagpur on 10<sup>th</sup> January 2014

Sri Saumendu Atta, Library Assistant has attended the Workshop on DELNET: Resources, Services & Facilities and Koha: An Open Sources ILMS at National Institute of Technology, Durgapur on 1<sup>st</sup> March 2014.

## **Publications**

H.P. Sharma, Digital Libraries in S&T in India – what purpose do they really serve? *Current Science*; vol. 105, no.5, 10<sup>th</sup> September 2013, p.565.

# **Equal Opportunity Cell**



## **EQUAL OPPORTUNITY CELL (EOC) (UNDER UGC SCHEME XIITH PLAN)**

The Equal Opportunity Cell was setup by the decision taken in the meeting of the 6<sup>th</sup> Executive Council held on 17.09.2009(vide: Res.No.06.06.01) of the University. The works of Equal Opportunity Cell are conducted from October 2009. The main objective of Equal Opportunity Cell is to run specific schemes of coaching for Scheduled Caste, Scheduled Tribes, OBC (non-creamy layer) Minorities, students of Economically and Academically weaker sections of the society in order to enhance proper academic achievements for their employability and success. One time grant of RS.2.lakhs for establishing the office of Equal Opportunity Cell has been provided under the scheme in XIth Plan Period and XIIth Plan Period has been started from October 2012.

The three schemes adopted by BESUS under EOC as per UGC guidelines are:- (i) Remedial coaching at UG and PG level of courses, (ii) Coaching for Entry into the Services, (iii) Coaching for NET/SET/GATE for Scheduled Caste, Scheduled Tribes and Minority, Academically and Socio-Economically weaker section of the students.

An Advisory committee was formed for the smooth functioning of Equal Opportunity Cell and the Present members of the Advisory Committee are:

Prof. B.K. Guha(Chairman)-Dean of Faculty Of Basic and Applied Sciences, nominated by Vice- Chancellor

Prof. Salil Halder(Member)-Aerospace Engg.& Applied Mechanics.

Prof. Abdur Rouf(Member)-Electrical Engg.

Prof. Ambarish Ghosh(Member)-Civil Engineering.

Prof. Sudip Roy(Member)-Civil Engineering.

Prof. Tapan Kumar Roy(Member)-Mathematics

Prof. P.K.Nandi(Invitee as Coordinator of NET/SET, etc)-Chemistry.

Prof. Rupen Basu Mallik(Invitee as Coordinator, Entry To Services)- Humanities &Social Sciences.

Prof. Sanjoy Sadhukhan(Invitee as Coordinator, Remedial Coaching)-Metallurgy & Materials Engg.

Dr. Biman Das(Invitee)-Development Officer.

Mr. Alok.Kumar Mitra (Invitee)-Assistant Proctor .

Mr. Bivore Das(Invitee)- Assistant Registrar.

**UGC GRANT - Rs. 50,000/- (XIIth Plan)**

**EXPENDITURE FOR THE YEAR (2013-14) – NIL**



**REMEDIAL COACHING SCHEME  
UNDER  
EQUAL OPPORTUNITY CELL  
(UNDER UGC SCHEME XIIITH PLAN)**

The coaching classes of Remedial Coaching Scheme have started from October 2009. At present the Remedial coaching Scheme at Undergraduate and Postgraduate Level for Scheduled Cast, Scheduled Tribes, Academically and financially weaker section and Minority Communities Student is running successfully. The registered students under this Scheme attend the classes which are taken by both internal and external faculties. Classes are held from Monday to Friday from 5 pm to 8 pm as per schedule in the allotted classroom. The coaching classes were discontinued at the time of examinations and vacations. The students also get classes of their regular subjects in which they find difficulties and from October 2012 XIIth Plan Period has been started. Classes have been proposed in the year 2013-14 on the following subjects:-

Mathematics, Chemistry, Electronics, Engineering Drawing, Mechanics, Electronics, Physics, C & C++ programming, Basic Electrical Engineering.

Number of registered students in 2013-14: **72**

UGC GRANT(RECURRING) - Rs. 2, 00,000/- [XIIth Plan Period]

UGC GRANT(NON-RECURRING) - Rs. 50,000/- [XIIth Plan Period]

**EXPENSE IN THE YEAR 2013-14**

RECURRING - Rs. 49,516/-

NON –RECURRING – NIL

**NET/SET/GATE COACHING SCHEME  
UNDER  
EQUAL OPPORTUNITY CELL  
(UNDER UGC SCHEME XIIITH PLAN)**

The coaching classes NET/SET have started from January 2010. At present NET/SET Coaching Scheme at Postgraduate(Basic and Applied Sciences) Level for Scheduled Cast, Scheduled Tribes, Academically and Financially weaker section and Minority Communities Student has been continuing successfully. The registered students under this Scheme attend the classes which are taken by both internal and external faculties. Classes are held from Monday to Friday from 5 pm to 8 pm as per schedule in respective departments with regular feedback from the students and from October 2012 XIIth Plan Period has been started. The coaching classes remain closed during examination and vacation periods. Classes have been proposed and conducted in the year 2013-14 on the following subjects:-

Chemistry, Mathematics, Physics.

Number of registered students in 2013-14: **43**

UGC GRANT(RECURRING) - Rs. 2, 00,000/- [XIIth Plan Period]

UGC GRANT(NON-RECURRING) - Rs. 50,000/- [XIIth Plan Period]

**EXPENSE IN THE YEAR 2013-14**

RECURRING - Rs. 1,54,331/-

NON –RECURRING – NIL

**ENTRY INTO THE SERVICES COACHING SCHEME  
UNDER  
EQUAL OPPORTUNITY CELL  
(UNDER UGC SCHEME XIITH PLAN)**

The coaching classes Entry into the Services have started from January 2010. At present Entry into the Services Scheme at Undergraduate and Postgraduate Level for Scheduled Cast, Scheduled Tribes, Academically and financially weaker section and Minority Communities Student is running successfully. The registered students under this Scheme attend the classes which are taken by both internal and external faculties. Classes are held from Monday to Friday from 5 pm to 8 pm as per schedule in respective departments and regular feedback is also taken from the students. The coaching classes were discontinued at the time of examinations and vacations. Coaching classes for this Scheme may be extended beyond our own students also. Classes have been conducted on the following subjects:-Chemistry, Mathematics, Food Processing, Nutrition Science, AutoCAD and Mat Lab.

From July 2011, IES (Indian Engineering Service) Exam's Coaching has been started for Civil and Electronics & Telecommunication Engineering students and in this financial year the IES Exam's Caching has been given for Civil Engineering students.

In April-May 2012, the Language Laboratory of the University has been renovated by modern equipments and after that three foreign languages such as Spanish, French & English have been learned by the different eminent faculties in the year 2013-14 in the lab successfully.

Number of registered students in 2013-14: **230**

UGC GRANT(RECURRING) - Rs. 2, 00,000/- [XIIth Plan Period]

UGC GRANT(NON-RECURRING) - Rs. 50,000/- [XIIth Plan Period]

**EXPENSE IN THE YEAR 2013-14**

RECURRING - Rs. 1,70,920/-

NON –RECURRING – NIL

# ***16<sup>th</sup> Annual Convocation***



**No. of medals awarded in the 16<sup>th</sup> Annual Convocation held on 25<sup>th</sup> February, 2014.**

| No. of Medals | Name of Medal                                | Category   |
|---------------|--|--|
| 1             | Ganesh Chandra Mitra Memorial Medal          | 1 <sup>st</sup> in Post Graduate Examination, 2013                                 |
| 1             | Sindhubala Mitra Memorial Medal              | 1 <sup>st</sup> in Master of Business Administration Examination, 2013             |
| 1             | Arun Chandra Mitra Memorial Medal            | 1 <sup>st</sup> in Master of Science Examination, 2013                             |
| 1             | The President of India Gold Medal            | 1 <sup>st</sup> in Under Graduate Examination, 2013                                |
| 1             | Prof. S.C. Dasgupta Gold Medal               | 1 <sup>st</sup> in Master of Science in Applied Mathematics Examination, 2013      |
| 1             | Prof. A.K. Seal Gold Medal                   | 1 <sup>st</sup> in Regular Master of Engineering Examination, 2013                 |
| 1             | Jaya Smriti Puroskar & Cash Prize Rs. 1000/- | Highest score in Mineralogy in M. Sc. Applied Geology Examination, 2013            |
| 31            | Silver Medals                                | Students who secured first position in their respective branches in the year 2013. |

**No. of degrees awarded in the 16<sup>th</sup> Annual Convocation held on 25<sup>th</sup> February, 2014.**

| Faculty                                 | UG    | PG  | Ph.D. |
|---|-------|-----|-------|
| Faculty of Engineering & Technology     | 432   | 247 | 21    |
| Faculty of Basic & Applied Sciences     | ----- | 96  | 9     |
| Faculty of Social & Management Sciences | ----- | 33  | 4     |



**List of Consultancy (2013 – 14)**

| Sl. No. | Project Code                    | Dept.      | Name of Principal Investigator      | Title of the Consultancy  | Funding Agency                                  | Duration  | Total Amount Sanctioned (Rs. in lakh) |
|---------|---------------------------------|------------|-------------------------------------|---|---|-----------|---------------------------------------|
| 1       | DRC/HAD-CON/CE/TKR/034/13-14    | Civil      | Tapas Kumar Roy                     | Structural vetting for Construction of Clear Water Reservoir, Pump House and Chorine House for dedicated water supply system for IOCL, Haldia Refinery  | Haldia Development Authority, Haldia            | 3 Months  | 3.3562                                |
| 2       | DRC/INSDAG-CON/MET/MG/033/13-14 | Metallurgy | Manojit Ghosh and Sanjoy Sadhukhan  | Welding & Fabrication of Steel Work   | INSDAG  | 4 Months  | 0.5641                                |
| 3       | DRC/ICPL-CON/CE/SKG/032/13-14   | Civil      | Saibal Kumar Ghosh                  | Vetting of G+8 Storied Building in Kolkata  | Indian City Properties Ltd.                     | 8 Weeks   | 4.4944                                |
| 4       | DRC/SPL-CON/CE/SKG/031/13-14    | Civil      | Saibal Kumar Ghosh                  | Vetting of DPR for Bairabi Dam Project, Mizoram   | Sikaria Power Ltd., Kolkata                     | 4 Weeks   | 2.2472                                |
| 5       | DRC/BI-CON/CE/SKG/030/13-14     | Civil      | Saibal Kumar Ghosh                  | Telescope Tower House at Falta  | Bose Institute, Kolkata                         | 6 Months  | 0.5618                                |
| 6       | DRC/TEPL-CON/CE/AG/029/13-14    | Civil      | Ambarish Ghosh                      | Validation of the designs and drawings for the work and Approval of "Design, Drawing, Construction of R.C.C. Intake Jetty and Jetty Mounted Pump House of capacity 210 MLD including substation building along with ancillary works at Glass Kothi Ghat, Titagarh under Trans-Municipal Water Supply Schemes of Titagarh and Khardah Municipality under JNNURM" | Traders & Engineers Private Ltd.                | 1 Month   | 0.7500                                |
| 7       | DRC/SIL-CON/CE/SKG/028/13-14    | Civil      | Saibal Kumar Ghosh                  | Third Party Consultancy for 11.5 Km Water Pipe Line   | Simplex Infrastructure Limited, Kolkata         | 24 Months | 415.7320                              |
| 8       | DRC/NRRDA-CON/CE/SKR/027/13-14  | Civil      | Sudip Kumar Roy                     | STA, PMGSY, West Bengal   | National Rural Roads Development Agency (NRRDA) | -         | 3.4414                                |
| 9       | DRC/HIT-CON/CE/SKR/026/13-14    | Civil      | Sudip Kumar Roy, Sandip Chakraborty | Preparation of DPR under JNNURM   | Howrah Improvement Trust                        | 1 Year    | 12.0000                               |



|    |  |              |   |   |   |               |         |
|----|--|--------------|---|---|---|---------------|---------|
| 10 | DRC/PKC-<br>CON/CE/T<br>KR/025/13-<br>14         | Civil        | Tapas Kumar<br>Roy  | Vetting of Plan and<br>Estimate of the Proposed<br>Library Building & PG<br>Building  | Prabhat<br>Kumar<br>College,<br>Contai                    | 1 Month       | 1.3000  |
| 11 | DRC/HIT-<br>CON/CE/A<br>G/021/13-<br>14          | Civil        | Ambarish<br>Ghosh, Sandip<br>Chakraborty,<br>Asok Adak,<br>Sujit Kumar<br>Dalui | Inspection of Sewer Line<br>Work at Doomrajala<br>Scheme - II, Phase - II<br>Work   | Howrah<br>Improvement<br>Trust                            | 1 Month       | 0.5000  |
| 12 | DRC/CRSP<br>L-<br>CON/IIPC/<br>AKM/024/<br>13-14 | IIPC         | Ashok Kumar<br>Maitra   | Technical Audit of DRV<br>Ropeways at Darjeeling  | Conveyor &<br>Ropeway<br>Services Pvt.<br>Ltd.            | One Time      | 1.5000  |
| 13 | DRC/S&W<br>L-<br>CON/CE/S<br>KG/023/13-<br>14    | Civil        | Saibal Kumar<br>Ghosh   | Design of DG Room &<br>Building in Meghalaya  | Sterling and<br>Wilson Ltd.                               | 1 Week        | 0.5618  |
| 14 | DRC/DES<br>NOZ-<br>CON/CHE<br>M/SS/022/1<br>3-14 | Chemistry    | Sabyasachi<br>Sarkar  | Desalination of Water by<br>Graphene  | Desnoz Inc.<br>(USA), Pvt.                                | 2 Years       | 4.5632  |
| 15 | DRC/DSCP<br>L-<br>CON/CE/A<br>G/020/13-<br>14    | Civil        | Ambarish<br>Ghosh   | Analysis of Soil Samples<br>to be used for Ash Dyke at<br>DVC, 2 x 600 MW<br>Raghunathpur Thermal<br>Power Project  | Dascon<br>Sourav<br>Commercial<br>Pvt. Ltd.               | 6 Months      | 1.5730  |
| 16 | DRC/PWD<br>-<br>CON/ARC<br>H/AS/019/1<br>3-14    | Architecture | Arup Sarkar   | Developing Concept Plan<br>for Interior Restructuring<br>and Remodelling of<br>Writers' Building  | Govt. of West<br>Bengal,<br>Principal<br>Secretary<br>PWD | A Few<br>Days | 20.8000 |
| 17 | DRC/TEPL<br>-<br>CON/CE/A<br>G/018/13-<br>14     | Civil        | Ambarish<br>Ghosh   | Validation of the soil test<br>report along with your<br>vetting reports for the<br>design and drawing by our<br>consultant on "Design &<br>Construction of One (1)<br>No. UGR-cum-Pump<br>House of 2.0 (Two) M.G.<br>capacity over pile<br>foundation at Panihati<br>Municipality on Turnkey<br>Basis under JNNURM | Traders &<br>Engineers<br>Private Ltd.                    | 6 Months      | 0.5000  |
| 18 | DRC/RL-<br>CON/HRM<br>/MKS/017/<br>13-14         | HRM          | Manas Kumar<br>Sanyal   | Advisory service for<br>preparation of Social and<br>Environmental Screening<br>Report  | RITES Ltd.  | 2 Months      | 1.0000  |
| 19 | DRC/KU-<br>CON/CE/S<br>KG/016/13-<br>14          | Civil        | Saibal Kumar<br>Ghosh   | Stability Checking of Lift<br>Structure   | Kalyani<br>University                                     | 1 Week        | 0.5000  |
| 20 | DRC/INSD<br>AG-<br>CON/MET/<br>SS/015/13-<br>14  | Metallurgy   | Sanjoy<br>Sadhukhan   | Compilation Work on<br>Stainless Steel for<br>Construction Segment  | INSDAG  | 4 Months      | 0.4944  |

|    |  |                |   |   |  |  |        |
|----|--|----------------|---|---|--|--|--------|
| 21 | DRC/WCL<br>-<br>CON/MIN/<br>PD/014/13-<br>14     | Minin<br>g     | Pratik Dutta                                | Consultancy on<br>Geotechnical Properties of<br>Rock at Bomi Iron Ore<br>Project  | Western<br>Cluster<br>Limited  | 6 Months   | 2.6460 |
| 22 | DRC/D&A<br>PL-<br>CON/CE/S<br>KG/013/13-<br>14   | Civil          | Saibal Kumar<br>Ghosh                       | Design of Ganga Sagar<br>Gate   | Dhar &<br>Associates<br>Pvt. Ltd.  | 2 Weeks  | 0.5618 |
| 23 | DRC/ITDC<br>IL-<br>CON/CE/S<br>KR/012/13-<br>14  | Civil          | Sudip Kumar<br>Roy                          | Consultancy Service in the<br>form of Advice and<br>Guidance for Pavement<br>Design of Runway,<br>Taxiway and Apron of<br>Kannur International<br>Airport, Kannur | ITD<br>Cementation<br>India Limited  | Mutually<br>agreed<br>upon<br>between<br>Sponsorin<br>g Agent<br>&<br>Consultan<br>t | 4.4944 |
| 24 | DRC/B&A-<br>CON/CE/S<br>KG/011/13-<br>14         | Civil          | Saibal Kumar<br>Ghosh                       | Vetting of Slip Form<br>Shuttering in Barauni   | Basu &<br>Associates,<br>Kolkata   | 1 Week   | 0.5618 |
| 25 | DRC/SPS<br>MIPL-<br>CON/CE/S<br>KR/010/13-<br>14 | Civil          | Sudip Kumar<br>Roy and<br>Ambarish<br>Ghosh | Pavement Construction<br>Quality Investigation for<br>road at IQ City, Durgapur   | SPS Mani<br>Infrastructure<br>Pvt. Ltd.                                    | 1 Month  | 2.5843 |
| 26 | DRC/RKD-<br>CON/CE/S<br>KG/009/13-<br>14         | Civil          | Saibal Kumar<br>Ghosh                       | Vetting of Shed in Sealdah<br>Railway Station   | M/S Ratan<br>Kumar Das,<br>Kolkata   | 4 Weeks  | 5.0000 |
| 27 | DRC/RL-<br>CON/CE/T<br>KR/008/13-<br>14          | Civil          | Tapas Kumar<br>Roy                          | Analysis on the WMM<br>materials to be used for<br>Development of Integrated<br>check-post at Petrapole,<br>along Indo-Bangladesh                                 | rites Ltd.   | 1 Month  | 0.1500 |
| 28 | DRC/IR-<br>CON/EE/K<br>DB/007/13-<br>14          | Electri<br>cal | Konika Das<br>(Bhattacharya)                | Automatic Power Factor<br>Controller  | Industrial<br>Repose   | 8 Months   | 0.5618 |
| 29 | DRC/LTSP<br>CL-<br>CON/CE/A<br>G/006/13-<br>14   | Civil          | Ambarish<br>Ghosh                           | Pile Integrity Test (PIT)<br>with PIT Collector Model<br>for TCS IT SEZ Project,<br>Kolkata   | L&T<br>Construction<br>SPCL UJV  | 1 Year   | 4.4944 |
| 30 | DRC/UCPP<br>L-<br>CON/CE/A<br>G/005/13-<br>14    | Civil          | Ambarish<br>Ghosh                           | Liquefaction analysis for<br>Industrial Activity at<br>Nayachar   | Universal<br>Crescent<br>Power Pvt.<br>Ltd.                                | 15 Days  | 1.6854 |
| 31 | DRC/L&T-<br>CON/CE/A<br>G/004/13-<br>14          | Civil          | Ambarish<br>Ghosh                           | Vetting of detail design of<br>substructures and<br>superstructure of Kalyani<br>ROB of KMDA Flyovers<br>and ROB  | M/S Larsen &<br>Toubro<br>Limited,<br>Construction<br>Infrastructure<br>IC | 15 Days  | 4.2697 |
| 32 | DRC/CESP<br>L-<br>CON/CE/S<br>KG/003/13-<br>14   | Civil          | Saibal Kumar<br>Ghosh                       | Vetting of Design of<br>Ancillary Unit of CLW at<br>Dankuni   | Consulting<br>Engineering<br>Services<br>(India) Pvt.<br>Ltd.              | 6 Months   | 2.8090 |

|    |  |       |   |  |   |         |        |
|----|--|-------|---|--|---|---------|--------|
| 33 | DRC/AMC<br>ON-<br>CON/CE/S<br>KG/001/13-<br>14 | Civil | Saibal Kumar<br>Ghosh                     | Vetting of Pre-Engineered<br>Building  | Amiya<br>Commerce &<br>Construction<br>Co. Pvt. Ltd.,<br>Kolkata              | 4 Weeks | 0.8989 |
| 34 | DRC/ME-<br>CON/CE/S<br>KR/002/13-<br>14        | Civil | Sudip Kumar<br>Roy and Tapas<br>Kumar Roy | Investigation Regarding<br>Pavement Deterioration in<br>the Kholapopota - Baduria<br>- Maslandapur - Habra<br>Road | MAXDWELL<br>Enterprise,<br>5/1, S.S.<br>Banerjee<br>Road, Kolkata<br>- 700060 | 1 Month | 0.3    |

**507.4570**

## List of ongoing Projects (2013 – 14)

| Sanction Date | Project Code                    | Financial Year | Dept.         | Name of Principal Investigator | Title of the Project  | Funding Agency   | Total Amount Sanctioned (Rs. in lakh) |
|---------------|---------------------------------|----------------|---------------|--------------------------------|---|--|---------------------------------------|
| 08.11.2013    | DRC/TATASTEEL/MET/DD/043/13-14  | 2013-2014      | Metallurgy    | Debdulal Das                   | Deformation and Damage Behavior of Automobile Grade Steels under Cyclic Loading   | Tata Steel, Jamshedpur   | 1.7978                                |
| 01.10.2013    | DRC/WBPDC L/ES/BPM/042/13-14    | 2013-2014      | Earth Science | Bhabani Prasad Mukhopadhyay    | Detailed Hydro-geological study to assess the sustainability of water sources especially during the lean season for 2 × 500 MW Extension Project at Sagardighi Thermal Power Project, Dist. Murshidabad, W.B.                   | The West Bengal Power Development Corporation Ltd., Govt. of West Bengal | 22.2200                               |
| 08.11.2013    | DRC/TATASTEEL/MET/SKG/037/13-14 | 2013-2014      | Metallurgy    | Swarup Kumar Ghosh             | Development of high strength multiphase steel through various processing conditions   | Tata Steel Ltd., Jamshedpur  | 1.7978                                |
| 17.02.2014    | DRC/OZTRON/CEGESS/HS/041/13-14  | 2013-2014      | CEGESS        | Hiranmoy Saha                  | Development of Generation Management Unit (Solar Smoother)  | Oztron Eco Energy Pvt. Ltd.  | 1.0000                                |
| 03.12.2013    | DRC/BRNS-DAE/CHEM/CB/040/13-14  | 2013-2014      | Chemistry     | Chinmoy Bhattacharya           | Preparation and characterization of stable nano-crystalline p-type Cu <sub>2</sub> O semiconductors modified with different metal doping for their applications in photoelectrochemical water splitting for Hydrogen generation | BRNS (DAE), Govt. of India   | 24.5125                               |
| 12.11.2013    | DRC/UoL/MIN/PD/036/13-14        | 2013-2014      | Mining        | Pratik Dutta                   | Shale Gas Analysis  | University of Leeds, UK  | GBP 20000                             |
| 10.10.2013    | DRC/CSIR/CHEM/BKG/033/13-14     | 2013-2014      | Chemistry     | Binay Krishna Ghorai           | Synthesis of $\pi$ - Conjugated Oligomers Utilizing Multi-fold Pd-Catalysed Coupling Reactions: Applications to the Organic Electronic Devices $\pi$  | CSIR   | 4.8500                                |
| 03.12.2013    | DRC/FPI&H/SOCSAT/SKM/039/13-14  | 2013-2014      | SOCSAT        | Sujay Kr. Mukherjee            | Creation of infrastructural facilities for running degree course in food processing technology  | Dept. of Food Processing Industries & Horticulture, Govt. of West Bengal | 74.7500                               |
| 31.07.2013    | DRC/WBRED A/CEGESS/HS/035/13-14 | 2013-2014      | CEGESS        | Hiranmoy Saha                  | Training of School Electrification Programme in West Bengal   | West Bengal Renewable Energy Development Agency                          | 3.1000                                |
| 27.09.2013    | DRC/DST/AE&AM/ARC/032/13-14     | 2013-2014      | AE&AM         | Amit Roy Chowdhury             | Development of Bone condition monitoring technique using Ultrasonographic sensor  | SERB   | 18.0000                               |

|            |                                  |           |            |                             |   |   |          |
|------------|----------------------------------|-----------|------------|-----------------------------|---|---|----------|
| 19.11.2013 | DRC/SERB-DST/CEGESS/SM/031/13-14 | 2013-2014 | CEGESS     | Sumita Mukhopadhyay         | Development of multilayer TCO for high efficiency thin film solar cell  | SERB  | 22.9280  |
| 25.09.2013 | DRC/DST-SAIF/SAIF/SKC/030/13-14  | 2013-2014 | SAIF       | Shyamal Kumar Chattopadhyay | Sophisticated Analytical Instrument Facility (SAIF)   | DST(GOI)  | 650.0000 |
| 23.07.2013 | DRC/BRNS-DAE/CE/KKB/029/13-14    | 2013-2014 | Civil      | Kalyan Kumar Bhar           | Identification of Spatial Dispersion Pattern of Dredge Materials in a Coastal River Reach from Radioactive Tracer Experiments and Hydrodynamic Modeling | Board of Research in Nuclear Sciences (BRNS), DAE, Govt. of India | 34.0310  |
| 19.09.2013 | DRC/ITRA-MLA/CST/SD B/028/13-14  | 2013-2014 | CST        | Sipra Das Bit               | Post-Disaster Situation Analysis and Resource Management Using Delay - Tolerant Peer-to-Peer Wireless Networks (DISARM)                                 | ITRA, Govt. of India, Media Lab Asia                              | 46.2900  |
| 19.09.2013 | DRC/ITRA-MLA/CST/JS/027/13-14    | 2013-2014 | CST        | Jaya Sil                    | Remote Health: A Framework for Healthcare Services using Mobile and Sensor - Cloud Technologies   | ITRA, Govt. of India, Media Lab Asia                              | 40.1100  |
| 20.09.2013 | DRC/DST-WEA/ETC/CR C/026/13-14   | 2013-2014 | ETC        | Chirasree Roychaudhuri      | SERB Women Excellence Award   | SERB  | 18.0000  |
| 05.09.2013 | DRC/DST/SM &R/SB/025/13-14       | 2013-2014 | SM&R       | Subhasis Bhaumik            | Multisensory Myoelectric Controlled Intelligent Active Ankle-Foot Prosthesis  | SERB  | 44.4000  |
| 25.04.2013 | DRC/DST/CH EM/AKM/024/13-14      | 2013-2014 | Chemistry  | Ajit Kumar Mahapatra        | Design and synthesis of fluoro and chromogenic chemodosimeters for toxic ions detection in solution and biospecimens                                    | SERB  | 42.8000  |
| 02.09.2013 | DRC/DST-DAAD/IT/HR/023/13-14     | 2013-2014 | IT         | Hafizur Rahaman             | Synthesis of Reversible Circuits using Probabilistic Methods and Functional Transformation  | DST-DAAD (GOI)  | 7.0100   |
| 14.08.2013 | DRC/DST/CE/AG/022/13-14          | 2013-2014 | Civil      | Ambarish Ghosh              | Performance Evaluation of River Brahmaputra bed materials for use in Construction of Road Embankment, Subgrade and Subbase                              | DST(GOI)  | 15.8020  |
| 27.05.2013 | DRC/INSA-YSP/ETC/PB/021/13-14    | 2013-2014 | ETC        | Partha Bhattacharyya        | Development of Metal-Insulator-Metal based Volatile Organic Compound Sensor for Monitoring of Ripeness of Orange  | INSA, Young Scientist Project                                     | 15.0000  |
| 10.05.2013 | DRC/DST-IFA/CHST/PD/020/13-14    | 2013-2014 | CHST       | Pallab Datta                | Biofabrication of Bioactive Scaffolds for Bone Regeneration and Investigation on the Mechanistic Basis for their Application                            | DST-Inspire Faculty Award   | 83.0000  |
| 24.07.2013 | DRC/AICTE/VLSI/HR/019/13-14      | 2013-2014 | VLSI       | Hafizur Rahaman             | Modernization of VLSI Design Laboratory   | AICTE   | 17.8000  |
| 04.02.2013 | DRC/AICTE/ME/SKS/018/13-14       | 2013-2014 | Mechanical | Sujoy Kumar Saha            | Heat Transfer Enhancement of Flow in a Circular Tube having Twisted Tapes with Oblique Teeth and Wire Coil Inserts                                      | AICTE   | 4.5000   |

|            |  |               |           |                                      |  |   |         |
|------------|--|---------------|-----------|--------------------------------------|--|---|---------|
| 07.03.2013 | DRC/DBT/CH<br>EM/JG/017/13-<br>14              | 2013-<br>2014 | Chemistry | Jhuma Ganguly                        | Isolation and<br>characterization of<br>metabolites &/or<br>polysaccharides as<br>anti-inflammatory<br>mediators from wild<br>and medicinal<br>mushrooms used in<br>ethnic medicine<br>system: An<br>investigation into<br>NFKB-MAPK-<br>Cytokine regulation<br>and its verification in<br>induced edema in vivo | DBT   | 18.9660 |
| 19.03.2013 | DRC/ADA-<br>NPMAS/ETC<br>/CRC/016/13-<br>14    | 2013-<br>2014 | ETC       | Chirasree<br>Roychaudhuri            | Establishment of New<br>National MEMS<br>Design Centers  | Aeronautica<br>l<br>Developme<br>nt Agency<br>(ADA,<br>NPMAS) | 5.5480  |
| 10.05.2013 | DRC/DST/CH<br>ST/AB/015/13-<br>14              | 2013-<br>2014 | CHST      | Ananya Barui                         | Fabrication of<br>biodegradable honey-<br>based scaffold for Ex-<br>Vivo expansion and<br>differentiation of<br>mesenchymal stem cell  | DST<br>(FTSYS),<br>GOI  | 21.4500 |
| 01.08.2013 | DRC/DST/SEI<br>HSM/SKP/014<br>/13-14           | 2013-<br>2014 | SEIHSM    | Subrata Kumar<br>Paul                | Development of a<br>Decision Support<br>System for Planning of<br>Capital Intensive<br>Transportation Links<br>(Bridges and Tunnels)<br>in the North Eastern<br>Region based on<br>Utility and Network<br>Robustness Criteria  | DST(GOI)  | 40.9240 |
| 08.07.2013 | DRC/DST/CH<br>EM/JD/013/13-<br>14              | 2013-<br>2014 | Chemistry | Jayati Datta                         | Performance testing of<br>direct alcohol fuel cell<br>using low level<br>platinum and platinum<br>free catalysts   | SERB  | 35.7000 |
| 19.07.2013 | DRC/NKDA/C<br>EGESS/HS/01<br>2/13-14           | 2013-<br>2014 | CEGESS    | Hiranmoy Saha                        | Solar City Program<br>(NKDA)   | NKDA  | 8.6565  |
| 20.06.2013 | DRC/SOVAP<br>OWER/CEGE<br>SS/HS/011/13-<br>14  | 2013-<br>2014 | CEGESS    | Hiranmoy Saha                        | Development of<br>Special Solar PV<br>modules and related<br>accessories for various<br>Solar Applications   | Sova Power<br>Ltd.  | 2.5000  |
| 18.04.2013 | DRC/ISRO-<br>IITKGP/ETC/S<br>RBC/010/13-<br>14 | 2013-<br>2014 | ETC       | Sekhar Ranjan<br>Bhadra<br>Chaudhuri | Studies on Rectro-<br>Directive Array for<br>Space Applications<br>(RAA)   | ISRO,<br>Space<br>Technology<br>Cell, IIT<br>Kharagpur        | 17.4600 |
| 28.05.2013 | DRC/DST/CE/<br>SC/009/13-14                    | 2013-<br>2014 | Civil     | Subrata<br>Chakraborty               | Seismic Vulnerability<br>Assessment of<br>Existing Building to<br>Supplement<br>Rehabilitation<br>practices with special<br>emphasis to North<br>Eastern Region  | DST(GOI)  | 60.7060 |
| 27.05.2013 | DRC/DST/SEI<br>HSM/SKR/008<br>/13-14           | 2013-<br>2014 | SEIHSM    | Sudip Kumar<br>Roy                   | Development of public<br>transport system<br>planning method for<br>incremental growth of<br>small and medium<br>cities of eastern and<br>north-eastern States   | DST(GOI)  | 67.3240 |
| 05.02.2013 | DRC/ICLEI-<br>SA/CEGESS/H<br>S/007/13-14       | 2013-<br>2014 | CEGESS    | Hiranmoy Saha                        | Howrah Solar City<br>Project   | ICLEI,<br>South Asia  | 2.0000  |
| 26.04.2013 | DRC/DST/CH<br>EM/AKM/006/<br>13-14             | 2013-<br>2014 | Chemistry | Ajit Kumar<br>Mahapatra              | Design and Synthesis<br>of Gold Nanoparticle-<br>Based Chemosensor<br>for Detection of Toxic<br>Ions Fluoride, Arsenic,<br>Mercury, Lead and<br>Cadmium  | DST (WB)  | 14.7310 |

|            |                             |           |           |                      |   |   |         |
|------------|-----------------------------|-----------|-----------|----------------------|---|---|---------|
| 25.03.2013 | DRC/UGC/SOCSAT/JB/005/13-14 | 2013-2014 | SOCSAT    | Jayati Bhowal        | Study on production of single cell proteotein for food and feed application from waste fruits   | UGC   | 1.6000  |
| 19.03.2013 | DRC/AICTE/ETC/SD/004/13-14  | 2013-2014 | ETC       | Santanu Das          | Design and Development of Printed Antennas on Paper Substrates for RFID Applications  | All India Council for Technical Education (AICTE) | 15.0000 |
| 22.03.2013 | DRC/UGC/CH EM/PKN/003/13-14 | 2013-2014 | Chemistry | Prasanta Kumar Nandi | Theoretical study of electronic structure, bonding and nonlinear optical properties of metal complexes in the gas and solution phases | UGC - Major                                       | 7.5280  |
| 14.03.2013 | DRC/UGC/IT/IB/002/13-14     | 2013-2014 | IT        | Indrajit Banerjee    | Fault Tolerant Routing in Wireless Sensor Networks  | UGC   | 7.8000  |
| 04.02.2013 | DRC/AICTE/IT/TS/001/13-14   | 2013-2014 | IT        | Tuhina Samanta       | Design and Analysis of Algorithms for Design Automation of Digital Microfluidic Biochip   | All India Council for Technical Education (AICTE) | 3.8500  |

**1501.4248**

B. BASU & CO.  
Chartered Accountants  
CA B.K.BASU, FCA

CG-141, Sector - II, Salt Lake City  
Kolkata - 700 091, Ph. : 2334-7418  
Mobile : 98304 36338  
E-mail : bidhan\_basu@yahoo.co.in

**BENGAL ENGINEERING & SCIENCE UNIVERSITY, SHIBPUR**  
(FORMERLY BENGAL ENGINEERING COLLEGE, D.U.)  
HOWRAH - 711 103

**BALANCE SHEET AS AT 31ST MARCH, 2014**

| PARTICULARS   | SCHEDULE | AS AT                   |    | AS AT                   |    |
|---|----------|-------------------------|----|-------------------------|----|
|   |          | 31.03.2014              |    | 31.03.2013              |    |
|   |          | RS.                     | P. | RS.                     | P. |
| <b><u>SOURCES OF FUNDS :-</u></b>   |          |                         |    |                         |    |
| i) GENERAL FUND   | 1        | 1,122,532,556.91        |    | 971,236,605.65          |    |
| ii) LOAN FUND (UBI)   | 2        | 611,106.00              |    | 3,130,236.00            |    |
| iii) PROJECTS FUND  | 3        | 230,899,901.08          |    | 179,950,045.08          |    |
| iv) DEVELOPMENT FUND  | 4        | 11,134,110.00           |    | 10,972,860.00           |    |
| v) ENDOWMENT FUND   | 5        | 25,403,066.44           |    | 20,528,753.94           |    |
| vi) PROVIDENT FUND (TREASURY)   | 41       | 108,873,407.00          |    | 93,529,095.00           |    |
| <b>TOTAL :</b>  |          | <b>1,499,454,147.43</b> |    | <b>1,279,347,595.67</b> |    |
| <b><u>APPLICATION OF FUNDS :-</u></b>   |          |                         |    |                         |    |
| A. FIXED ASSETS   | 6        | 638,392,105.93          |    | 626,128,039.73          |    |
| <b>TOTAL OF "A"</b>   |          | <b>638,392,105.93</b>   |    | <b>626,128,039.73</b>   |    |
| <b><u>B. CURRENT ASSETS, LOANS &amp; ADVANCES</u></b>                             |          |                         |    |                         |    |
| i) Cash & Bank Balances   | 7        | 570,614,005.73          |    | 392,583,086.37          |    |
| ii) Fixed Deposits  | 8        | 278,575,528.00          |    | 235,514,413.00          |    |
| iii) Advances   | 9        | 23,002,529.00           |    | 10,245,136.00           |    |
| iv) Interest Receivable on Provident Fund (Treasury)<br>for 2012-2013 F.Y. - B/F. |          | 7,211,956.00            |    | 7,211,956.00            |    |
| <b>TOTAL OF "B"</b>   |          | <b>879,404,018.73</b>   |    | <b>645,554,591.37</b>   |    |



Contd.....





B. BASU & CO.  
Chartered Accountants  
CA B.K.BASU, FCA

CG-141, Sector - II, Salt Lake City  
Kolkata - 700 091, Ph. : 2334-7418  
Mobile : 98304 36338  
E-mail : bidhan\_basu@yahoo.co.in

**BENGAL ENGINEERING & SCIENCE UNIVERSITY, SHIBPUR**  
(FORMERLY BENGAL ENGINEERING COLLEGE, D.U.)  
HOWRAH - 711 103

**BALANCE SHEET AS AT 31ST MARCH, 2014 (contd.)**

| PARTICULARS  | SCHEDULE | AS AT<br>31.03.2014     |    | AS AT<br>31.03.2013     |    |
|--|----------|-------------------------|----|-------------------------|----|
|  |          | RS.                     | P. | RS.                     | P. |
| <b>C. LIABILITIES :-</b>                           |          |                         |    |                         |    |
| i) Amount Received for disbursement of Scholarship | 10       | (6,969,934.20)          |    | (30,914,299.00)         |    |
| ii) Amount Received for disbursement for others    | 11       | 23,463,956.30           |    | 22,155,212.30           |    |
| iii) Other Liabilities                             | 12       | 1,847,955.13            |    | 1,094,122.13            |    |
| <b>TOTAL OF "C"</b>                                |          | <u>18,341,977.23</u>    |    | <u>(7,664,964.57)</u>   |    |
| <b>D. NET CURRENT ASSETS (B - C)</b>               |          | 861,062,041.50          |    | 653,219,555.94          |    |
| <b>TOTAL :</b>                                     |          | <u>1,499,454,147.43</u> |    | <u>1,279,347,595.67</u> |    |

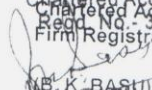
NOTES ON ACCOUNTS

42

  
FINANCE OFFICER

  
REGISTRAR

Place : KOLKATA  
Date :

**FOR B. BASU & CO.**  
For B. Basu & Co.  
Chartered Accountants  
Firm Registration No. 322609E  
  
B.K. BASU, Proprietor  
Membership No. 007967





BASU & CO.  
Chartered Accountants  
B.K.BASU, FCA

CG-141, Sector - II, Salt Lake City  
Kolkata - 700 091, Ph. : 2334-7418  
Mobile : 98304 36338  
E-mail : bidhan\_basu@yahoo.co.in

BENGAL ENGINEERING & SCIENCE UNIVERSITY, SHIBPUR  
(FORMERLY BENGAL ENGINEERING COLLEGE, D.U.)  
HOWRAH - 711 103

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2014

|   | <u>SCHEDULE</u> | <u>CURRENT YEAR</u>   | <u>PREVIOUS YEAR</u>   |
|---|-----------------|-----------------------|------------------------|
|   |                 | RS.                   | P.                     |
|   |                 | RS.                   | P.                     |
| <u>INCOME:-</u>   |                 |                       |                        |
| Collection from students                                      | 13              | 82,048,875.24         | 79,521,821.70          |
| Other Receipts  | 14              | 48,994,768.01         | 18,134,055.98          |
| Grant Received  | 15              | 492,263,829.00        | 399,923,421.00         |
| Interest on S.B. Accounts / Fixed Deposit / Others            | 16              | 38,726,608.37         | 32,756,214.95          |
| Receipts from P.A.O.  | 17              | 12,749,594.00         | 29,395,308.00          |
|   |                 | <u>674,783,674.62</u> | <u>559,730,821.63</u>  |
| <u>EXPENDITURE:-</u>  |                 |                       |                        |
| Salaries & Allowances   | 18              | 416,539,069.80        | 390,123,114.00         |
| Other Expenses  | 19              | 40,060,025.84         | 14,729,993.00          |
| Office Expenses   | 20              | 50,366,971.42         | 48,186,289.07          |
| Departmental Expenses   | 21              | 97,742,289.00         | 76,567,722.00          |
| Payment made against U.G.C.                                   | 22              | 3,457,367.00          | 5,261,005.00           |
| Depreciation on Fixed Assets                                  | 6               | 75,871,191.80         | 76,815,218.17          |
|   |                 | <u>684,036,914.86</u> | <u>611,683,341.24</u>  |
| TOTAL   |                 |                       |                        |
|   |                 | <u>(9,253,240.24)</u> | <u>(51,952,519.61)</u> |
| Excess of Income over Expenditure transferred to General Fund |                 |                       |                        |

FINANCE OFFICER

REGISTRAR

Place : KOLKATA  
Date :



FOR B. BASU & CO.  
Chartered Accountants  
Firm Registration No. 822609E  
(B.K. BASU)  
Proprietor  
Membership No. 007967



B. BASU & CO.  
Chartered Accountants  
CA B.K. BASU, FCA

CG-141, Sector - II, Salt Lake City  
Kolkata - 700 091, Ph. : 2334-7418  
Mobile : 98304 36338  
E-mail : bidhan\_basu@yahoo.co.in

BENGAL ENGINEERING & SCIENCE UNIVERSITY, SHIBPUR  
(FORMERLY BENGAL ENGINEERING COLLEGE, D.U.)  
HOWRAH - 711 103

**RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2014**

| RECEIPTS :-   | SCHEDULE | CURRENT YEAR            |    | PREVIOUS YEAR           |    |
|---|----------|-------------------------|----|-------------------------|----|
|   |          | RS.                     | P. | RS.                     | P. |
| Cash And Bank Balances (Opening)                          | 23       | 392,583,086.37          |    | 341,857,248.44          |    |
| Collection From Students                                  | 24       | 82,048,875.24           |    | 79,521,821.70           |    |
| Other Receipts  | 25       | 118,988,170.38          |    | 122,447,548.86          |    |
| Grant Received  | 26       | 853,867,399.60          |    | 621,133,409.00          |    |
| Receipts From P.A.O. / Treasury / Others                  | 27       | 30,041,422.00           |    | 47,186,705.00           |    |
| Receipts Of Scholarships                                  | 28       | 66,655,166.80           |    | 16,151,176.00           |    |
| Deductions From Salaries                                  | 29       | 78,380,718.00           |    | 57,934,390.00           |    |
|   |          | <b>1,622,564,838.39</b> |    | <b>1,286,232,299.00</b> |    |
| <b>PRIOR PERIOD ADJUSTMENTS :-</b>                        |          |                         |    |                         |    |
| Corpus Fund A/c No. 0171010375799                         |          | ----                    |    | 90,170.00               |    |
| Faculty Development Fund A/c No. 1532010020688            |          | ----                    |    | 5,000.00                |    |
| Equipment Replacement Fund A/c No. 1532010020679          |          | ----                    |    | 5,000.00                |    |
| Maintenance Fund A/c No. 0171010375829                    |          | ----                    |    | 148,145.78              |    |
| Depreciation Fund A/c No. 0171010375811                   |          | ----                    |    | 63,339.00               |    |
| Staff Development Fund A/c No. 0171010375802              |          | ----                    |    | 71,820.00               |    |
| BESUS Foundation A/c No. 1532010006354                    |          | ----                    |    | 233,077.98              |    |
| BESUS Foundation (Sweep A/c)                              |          | ----                    |    | 4,225,000.00            |    |
| Fixed Deposits with BESUS Foundation A/c                  |          | 2,066,122.00            |    | ----                    |    |
| <b>TOTAL :</b>  |          | <b>1,624,630,960.39</b> |    | <b>1,291,073,851.76</b> |    |
| <b>PAYMENTS :-</b>  |          |                         |    |                         |    |
| Pay And Allowances  | 30       | 402,969,484.80          |    | 356,729,480.00          |    |
| Office Expenses   | 31       | 50,581,913.42           |    | 48,190,558.07           |    |
| Department Expenses                                       | 32       | 97,742,289.00           |    | 76,567,722.00           |    |
| Building, Equipment, Furniture, Elect. Fittings & Books   | 33       | 88,135,258.00           |    | 112,917,121.00          |    |
| Other Expenses  | 34       | 40,224,840.84           |    | 14,554,965.00           |    |
| Advances & Deposits                                       | 35       | 72,986,280.00           |    | 44,982,209.32           |    |
| Payment Made Against Projects                             | 36       | 150,753,699.60          |    | 88,783,444.00           |    |
| Payment Made Against Receipts From P.A.O./Treasury/Others | 37       | 29,552,669.00           |    | 51,671,199.00           |    |
| Disbursement Of Scholarships                              | 38       | 42,689,802.00           |    | 46,159,677.00           |    |
| Deposits Of Deductions From Salaries                      | 39       | 78,380,718.00           |    | 57,934,390.00           |    |
| Cash And Bank Balances (Closing)                          | 40       | 570,614,005.73          |    | 392,583,086.37          |    |
| <b>TOTAL :</b>  |          | <b>1,624,630,960.39</b> |    | <b>1,291,073,851.76</b> |    |

FINANCE OFFICER

REGISTRAR

FOR B. BASU & CO.  
Chartered Accountants  
Reg. No. 322609E  
(B. K. BASU)  
Proprietor  
B.K. BASU, Proprietor  
Membership No. 997967  
M. NO. 60789

Place : KOLKATA  
Date :

