**Indian Institute of Engineering Science and Technology, Shibpur**

Course Structure for Two-Year <**M.Tech**/MOP/M.Sc/MBA> Program (From 2019 Onward)

**Department/~~School/Center of~~ <Metallurgy and Materials Engineering>**

**Specialization (if any): *Surface Engineering***

**1st Semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sl. No | Course Name | Course code | Class Load/Week | | | Credit | Marks |
| L | T | P |  |  |
| 1. | Paper I: **Materials Technology** | **MM5101** | 3 | 0 | 0 | 3 | 100 |
| 2. | Paper II: **Advanced Characterization of Materials** | **MM5102** | 3 | 0 | 0 | 3 | 100 |
| 3. | Paper III: **Advanced Thermodynamics and Kinetics** | **MM5103** | 3 | 0 | 0 | 3 | 100 |
| 4. | Paper IV: (Dep. Elective) |  | 3 | 0 | 0 | 3 | 100 |
| 5. | Paper V: (Open Elective) |  | 3 | 0 | 0 | 3 | 100 |
|  | **Theory Sub-total** |  | **15** | **0** | **0** | **15** | **500** |
| 6. | Lab1 **Materials Technology Lab.** | **MM5171** | 0 | 0 | 3 | 2 | 100 |
| 7. | Lab2 **Advanced Characterization of Materials Lab.** | **MM5172** | 0 | 0 | 3 | 2 | 100 |
| 8. | Mini Project - I **Mini Project on Advanced Thermodynamics and Kinetics** | **MM5175** | 0 | 0 | 3 | 2 | 100 |
|  | **Practical Sub-total** |  | **0** | **0** | **9** | **6** | **300** |
|  | 1st Semester Total |  | **15** | **0** | **9** | **21** | **800** |

**2nd Semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sl. No | Course Name | Course code | Class Load/Week | | | Credit | Marks |
| L | T | P |  |  |
| 1. | Paper VI: **Manufacturing Processes** | **MM5201** | 3 | 0 | 0 | 3 | 100 |
| 2. | Paper VII: **Design and Selection of Materials** | **MM5202** | 3 | 0 | 0 | 3 | 100 |
| 3. | Paper VIII: **Defects in Materials** | **MM5203** | 3 | 0 | 0 | 3 | 100 |
| 4. | Paper IX (Dep. Elective) |  | 3 | 0 | 0 | 3 | 100 |
| 5. | Paper X (Open Elective) |  | 3 | 0 | 0 | 3 | 100 |
|  | **Theory Subtotal** |  | **15** | **0** | **0** | **15** | **500** |
| 6. | Term Paper | **MM5291** | 0 | 0 | 8 | 4 | 200 |
| 7. | Term Paper Seminar & Viva-voce | **MM5292** | 0 | 0 | 0 | 2 | 100 |
|  | **Practical Subtotal** |  | **0** | **0** | **8** | **6** | **300** |
|  | 2nd Semester Total |  | **15** | **0** | **8** | **21** | **800** |

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| **Paper IV [Departmental Elective]** | | **Paper IX [Departmental Elective]** | |
| **Course Code** | **Course Title** | **Course Code** | **Course Title** |
| **MM5121** | **Surface Treatment and Modification** | **MM5221** | **Surface Degradation and Protection** |
| **MM5122** | **Mechanical Behaviour of Thin Films** | **MM5222** | **Engineering Tribology** |

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| **Paper IV [Open Elective ]** | | **Paper IX [Open Elective]** | |
| **Course Code** | **Course Title** | **Course Code** | **Course Title** |
| **MM5161** | **Mechanical Behaviour of Engineering Materials** | **MM5261** | **Nanostructures and Nanomaterials** |
| **MM5162** | **Multiscale Modelling** | **MM5262** | **Microelectromechanical Systems: Materials and Processes** |
| **MM5163** | **Microstructure Modelling** | **MM5263** | **Biomedical Materials and Devices** |
|  |  | **MM5264** | **Non-destructive Testing** |

**Specialization (if any): *Iron and Steel Technology***

**1st Semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sl. No | Course Name | Course code | Class Load/Week | | | Credit | Marks |
| L | T | P |  |  |
| 1. | Paper I: **Materials Technology** | **MM5101** | 3 | 0 | 0 | 3 | 100 |
| 2. | Paper II: **Advanced Characterization of Materials** | **MM5102** | 3 | 0 | 0 | 3 | 100 |
| 3. | Paper III: **Advanced Thermodynamics and Kinetics** | **MM5103** | 3 | 0 | 0 | 3 | 100 |
| 4. | Paper IV: (Dep. Elective) |  | 3 | 0 | 0 | 3 | 100 |
| 5. | Paper V: (Open Elective) |  | 3 | 0 | 0 | 3 | 100 |
|  | **Theory Sub-total** |  | **15** | **0** | **0** | **15** | **500** |
| 6. | Lab1 **Materials Technology Lab.** | **MM5171** | 0 | 0 | 3 | 2 | 100 |
| 7. | Lab2 **Advanced Characterization of Materials Lab.** | **MM5172** | 0 | 0 | 3 | 2 | 100 |
| 8. | Mini Project - I **Mini Project on Advanced Thermodynamics and Kinetics** | **MM5175** | 0 | 0 | 3 | 2 | 100 |
|  | **Practical Sub-total** |  | **0** | **0** | **9** | **6** | **300** |
|  | 1st Semester Total |  | **15** | **0** | **9** | **21** | **800** |

**2nd Semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sl. No | Course Name | Course code | Class Load/Week | | | Credit | Marks |
| L | T | P |  |  |
| 1. | Paper VI: **Manufacturing Processes** | **MM5201** | 3 | 0 | 0 | 3 | 100 |
| 2. | Paper VII: **Design and Selection of Materials** | **MM5202** | 3 | 0 | 0 | 3 | 100 |
| 3. | Paper VIII: **Defects in Materials** | **MM5203** | 3 | 0 | 0 | 3 | 100 |
| 4. | Paper IX (Dep. Elective) |  | 3 | 0 | 0 | 3 | 100 |
| 5. | Paper X (Open Elective) |  | 3 | 0 | 0 | 3 | 100 |
|  | **Theory Subtotal** |  | **15** | **0** | **0** | **15** | **500** |
| 6. | Term Paper | **MM5291** | 0 | 0 | 8 | 4 | 200 |
| 7. | Term Paper Seminar & Viva-voce | **MM5292** | 0 | 0 | 0 | 2 | 100 |
|  | **Practical Subtotal** |  | **0** | **0** | **8** | **6** | **300** |
|  | 2nd Semester Total |  | **15** | **0** | **8** | **21** | **800** |

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| --- | --- | --- | --- |
| **Paper IV [Departmental Elective]** | | **Paper IX [Departmental Elective]** | |
| **Course Code** | **Course Title** | **Course Code** | **Course Title** |
| **MM5123** | **Advanced Iron and Steel Making** | **MM5222** | **Engineering Tribology** |
| **MM5124** | **Crystallographic Texture of Materials** | **MM5223** | **Advanced Ferrous Materials** |
|  |  | **MM5224** | **Advanced Joining Techniques** |

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| **Paper IV [Open Elective ]** | | **Paper IX [Open Elective]** | |
| **Course Code** | **Course Title** | **Course Code** | **Course Title** |
| **MM5161** | **Mechanical Behaviour of Engineering Materials** | **MM5261** | **Nanostructures and Nanomaterials** |
| **MM5162** | **Multiscale Modelling** | **MM5262** | **Microelectromechanical Systems: Materials and Processes** |
| **MM5163** | **Microstructure Modelling** | **MM5263** | **Biomedical Materials and Devices** |
|  |  | **MM5264** | **Non-destructive Testing** |