

**CENTRE FOR NANOTECHNOLOGY  
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : **XXX M.Tech. (Nanoscience & Nanotechnology)**  
 Department : **Centre for Nanotechnology**  
 Year : **I**  
 Model : **2**

| Teaching Scheme             |              |                                                      |              |           | Contact Hours/Week |   |   | Exam Duration |           |
|-----------------------------|--------------|------------------------------------------------------|--------------|-----------|--------------------|---|---|---------------|-----------|
| S.No.                       | Subject Code | Course Title                                         | Subject Area | Credits   | L                  | T | P | Theory        | Practical |
| <b>Semester-I (Autumn)</b>  |              |                                                      |              |           |                    |   |   |               |           |
| 1.                          | NTC-501      | Nanoscale Materials                                  | PCC          | 3         | 3                  | 0 | 0 | 3             | 0         |
| 2.                          | NTC-503      | Advanced Characterizations and Analytical Techniques | PCC          | 3         | 3                  | 0 | 0 | 3             | 0         |
| 3.                          | NTC-505      | Emerging Applications of Nanomaterials               | PCC          | 4         | 3                  | 1 | 0 | 3             | 0         |
| 4.                          | NTC-507      | Nanoscale Modelling and Simulation                   | PCC          | 4         | 3                  | 0 | 2 | 3             | 0         |
| 5.                          | NTC-509      | Laboratory                                           | PCC          | 2         | 0                  | 0 | 4 | 0             | 4         |
| 6.                          |              | Social Science Course                                | SSC          | 2         | -                  | - | - | -             | -         |
|                             |              | <b>Total</b>                                         |              | <b>18</b> |                    |   |   |               |           |
| <b>Semester-II (Spring)</b> |              |                                                      |              |           |                    |   |   |               |           |
| 1.                          |              | Program Elective-I                                   | PEC          | 4         | -                  | - | - | -             | -         |
| 2.                          |              | Program Elective-II                                  | PEC          | 4         | -                  | - | - | -             | -         |
| 3.                          |              | Program Elective-III                                 | PEC          | 4         | -                  | - | - | -             | -         |
| 4.                          |              | Program Elective-IV                                  | PEC          | 4         | -                  | - | - | -             | -         |
| 5.                          |              | Science, Technology, and Advanced Research-tools     | STAR         | 3         | -                  | - | - | -             | -         |
| 6.                          | NTC-700      | Seminar                                              | SEM          | 2         | -                  | - | - | -             | -         |
|                             |              | <b>Total</b>                                         |              | <b>21</b> |                    |   |   |               |           |

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Program Code : **XXX M.Tech. (Nanoscience & Nanotechnology)**  
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 Year : **II**  
 Model : **2**

| Teaching Scheme             |              |                            |              |           | Contact Hours/Week |   |   | Exam Duration |           |
|-----------------------------|--------------|----------------------------|--------------|-----------|--------------------|---|---|---------------|-----------|
| S.No.                       | Subject Code | Course Title               | Subject Area | Credits   | L                  | T | P | Theory        | Practical |
| <b>Semester-I (Autumn)</b>  |              |                            |              |           |                    |   |   |               |           |
| 1.                          | NTC-691      | Internship Social Activity | ISA          | 3         | -                  | - | - | -             | -         |
| 2.                          | NTC-701A     | Thesis Stage-I             | THESIS       | 10        | -                  | - | - | -             | -         |
|                             |              | <b>Total</b>               |              | <b>13</b> |                    |   |   |               |           |
| <b>Semester-II (Spring)</b> |              |                            |              |           |                    |   |   |               |           |
| 1.                          | NTC-701B     | Thesis Stage-II            | THESIS       | 14        | -                  | - | - | -             | -         |
|                             |              | <b>Total</b>               |              | <b>14</b> |                    |   |   |               |           |

| Summary                     |           |    |    |    |
|-----------------------------|-----------|----|----|----|
| Semester                    | 1         | 2  | 3  | 4  |
| Semester-wise Total Credits | 18        | 21 | 13 | 14 |
| <b>Total Credits</b>        | <b>66</b> |    |    |    |

**M.Tech. (Nanoscience & Nanotechnology)**

**Program Elective Courses**

| Teaching Scheme |              |                                                                   |              |         | Contact Hours/Week |   |   | Exam Duration |           |
|-----------------|--------------|-------------------------------------------------------------------|--------------|---------|--------------------|---|---|---------------|-----------|
| S.No.           | Subject Code | Course Title                                                      | Subject Area | Credits | L                  | T | P | Theory        | Practical |
| 1.              | NTL-501      | Structural Analysis of Nanomaterials                              | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |
| 2.              | NTL-502      | Supramolecular Chemistry of Nanomaterials                         | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |
| 3.              | NTL-503      | Physics of Nanomaterials                                          | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |
| 4.              | NTL-504      | Biomedical Nanotechnology                                         | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |
| 5.              | NTL-505      | Electronic Properties and Measurement Techniques of Nanomaterials | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |
| 6.              | NTL-506      | Nanoscale Fabrication Techniques                                  | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |
| 7.              | NTL-507      | Environmental Nanotechnology                                      | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |
| 8.              | NTL-508      | Surface Engineering of Nanoscale Materials                        | PEC          | 4       | 3                  | 1 | 0 | 3             | 0         |

**M.Tech. (Nanoscience & Nanotechnology)**

**Science, Technology, and Advanced Research-tools Basket**

| Teaching Scheme |              |                                 |              |         | Contact Hours/Week |   |   | Exam Duration |           |
|-----------------|--------------|---------------------------------|--------------|---------|--------------------|---|---|---------------|-----------|
| S.No.           | Subject Code | Course Title                    | Subject Area | Credits | L                  | T | P | Theory        | Practical |
| 1.              | NTT-501      | Technology of Nanoscale Devices | STAR         | 3       | 3                  | 0 | 0 | 3             | 0         |
| 2.              | NTT-502      | Quantum Materials               | STAR         | 3       | 3                  | 0 | 0 | 3             | 0         |
| 3.              | NTT-503      | AI and ML for Nanotechnology    | STAR         | 3       | 2                  | 0 | 2 | 3             | 0         |

**Social Sciences Course Basket**

| Teaching Scheme |              |                                              |              |         | Contact Hours/Week |   |   | Exam Duration |           |
|-----------------|--------------|----------------------------------------------|--------------|---------|--------------------|---|---|---------------|-----------|
| S.No.           | Subject Code | Course Title                                 | Subject Area | Credits | L                  | T | P | Theory        | Practical |
| 1.              | NTS-501      | Safety and Ethics in Nanotechnology Research | SSC          | 2       | 2                  | 0 | 0 | 3             | 0         |