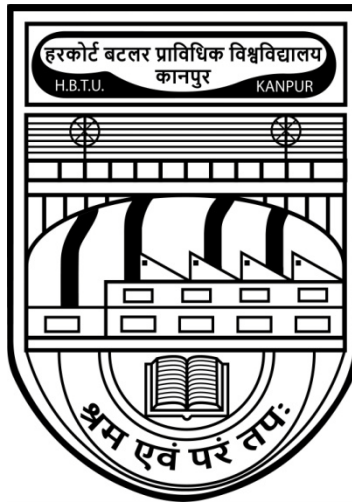


**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**MASTER OF TECHNOLOGY  
MECHANICAL ENGINEERING**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY  
KANPUR-208002 (UP) – INDIA**

**DEPARTMENT OF MECHANICAL ENGINEERING  
COURSE STRUCTURE & EVALUATION SCHEME  
M.TECH. MECHANICAL ENGINEERING DESIGN  
(PART TIME PROGRAMME)**

**SEMESTER I**

| Sr. No.              | Course Type | Subject Code | Course Title                    | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                                 |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EME 515      | Numerical Methods for Engineers | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | EME 503      | Advance Mechanics of Solids     | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | EME 509      | Advance Machine Design          | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                                 | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER II**

| Sr. No.              | Course Type | Subject Code | Course Title                          | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---------------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                                       |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EME 502      | Optimization Methods for Engg. Design | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | EME 506      | Material Selection in Design          | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | EME 508      | Robotics & Control                    | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                                       | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER III**

| Sr. No.              | Course Type | Subject Code | Course Title                 | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EME 601      | Product Design & Development | 4 (3-1-0)       | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC         | PEC I        | PEC-I                        | 4 (3-1-0)       | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Seminar     | EME 671      | Seminar                      | 2 (0-0-4)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                              | <b>10</b>       |                 |    |     |       |     |            |

**SEMESTER IV**

| Sr. No.              | Course Type | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PEC         | PEC II       | PEC-II       | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC         | PEC III      | PEC-III      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Project     | EME 680      | Mini Project | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |              | <b>10</b>       |                 |    |     |       |     |            |

PCC-Programme Core course; PEC-Programme Elective Course

### SEMESTER V

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | EME 691      | Dissertation | 8(0-0-16)       |                 | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

### SEMESTER VI

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | EME 692      | Dissertation | 8(0-0-16)       |                 | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

**Total Programme Credits : 60**

EME 691 Dissertation will have Internal Evaluation while EME 692 Dissertation will have External Evaluation.

**DEPARTMENT OF MECHANICAL ENGINEERING  
COURSE STRUCTURE & EVALUATION SCHEME  
M.TECH. INDUSTRIAL SYSTEM ENGINEERING  
(PART TIME PROGRAMME)**

**SEMESTER I**

| Sr. No.              | Course Type | Subject Code | Course Title                    | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                                 |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EME 515      | Numerical Methods for Engineers | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | EME 511      | Manufacturing System            | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | EME 513      | Operation Research              | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                                 | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER II**

| Sr. No.              | Course Type | Subject Code | Course Title                          | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---------------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                                       |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EME 502      | Optimization Methods for Engg. Design | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | EME 510      | Production and Operation Management   | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | EME 512      | Rapid Prototyping                     | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                                       | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER III**

| Sr. No.              | Course Type | Subject Code | Course Title                 | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EME 601      | Product Design & Development | 4 (3-1-0)       | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC         | PEC I        | PEC-I                        | 4 (3-1-0)       | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Seminar     | EME 671      | Seminar                      | 2 (0-0-4)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                              | <b>10</b>       |                 |    |     |       |     |            |

**SEMESTER IV**

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PEC          | PEC II       | PEC-II       | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC          | PEC III      | PEC-III      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Mini Project | EME 680      | Mini Project | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>10</b>       |                 |    |     |       |     |            |

### SEMESTER V

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | EME 691      | Dissertation | 8(0-0-16)       |                 | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

### SEMESTER VI

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | EME 692      | Dissertation | 8(0-0-16)       |                 | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

**Total Programme Credits : 60**

EME 691 Dissertation will have Internal Evaluation while EME 692 Dissertation will have External Evaluation.

**DEPARTMENT OF MECHANICAL ENGINEERING**  
**LIST OF ELECTIVE COURSES**  
**(PART TIME PROGRAMME)**

**Programme Elective-I**

| <b>S. No.</b> | <b>Course Code</b> | <b>Course Name</b>                | <b>Credits</b> |
|---------------|--------------------|-----------------------------------|----------------|
| 1.            | EME 530/531        | Theory of Elasticity & Plasticity | 4 (3-1-0)      |
| 2.            | EME 532/533        | Computational Fluid Dynamics      | 4 (3-1-0)      |
| 3.            | EME 534/535        | Smart Materials & Structures      | 4 (3-1-0)      |
| 4.            | EME 536/537        | Industrial Design and Ergonomics  | 4 (3-1-0)      |
| 5.            | EME 538/539        | Rapid Prototyping & Tooling       | 4 (3-1-0)      |
| 6.            | EME 540/541        | Advanced Manufacturing Processes  | 4 (3-1-0)      |

**Programme Elective-II**

|    |             |                                |           |
|----|-------------|--------------------------------|-----------|
| 1. | EME 566/567 | Advanced Mechanical Vibrations | 4 (3-1-0) |
| 2. | EME 568/569 | Introduction to Robotics       | 4 (3-1-0) |
| 3. | EME 570/571 | Flexible Manufacturing System  | 4 (3-1-0) |
| 4. | EME 572/573 | Reliability & Maintenance      | 4 (3-1-0) |
| 5. | EME 574/575 | Composite Materials            | 4 (3-1-0) |

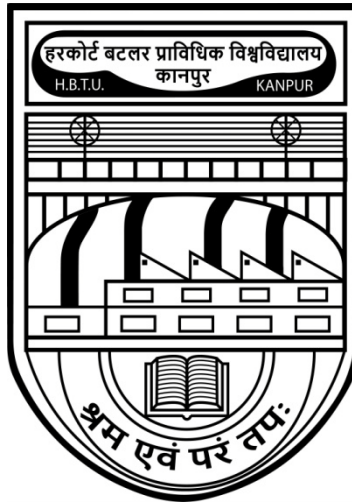
**Programme Elective-III**

|    |             |                                 |           |
|----|-------------|---------------------------------|-----------|
| 1. | EME 611/612 | Computer Aided Manufacturing    | 4 (3-1-0) |
| 2. | EME 613/614 | Fracture Mechanics              | 4 (3-1-0) |
| 3. | EME 615/616 | Neural Network & Fuzzy Systems  | 4 (3-1-0) |
| 4. | EME 617/618 | Design of Thermal System        | 4 (3-1-0) |
| 5. | EME 619/620 | Advance Machine Design          | 4 (3-1-0) |
| 6. | EME 621/622 | Simulation, Modeling & Analysis | 4 (3-1-0) |

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**MASTER OF TECHNOLOGY  
CIVIL ENGINEERING**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY  
KANPUR-208002 (UP) – INDIA**

**DEPARTMENT OF CIVIL ENGINEERING**  
**COURSE STRUCTURE & EVALUATION SCHEME**  
**M.TECH. SOIL MECHANICS AND FOUNDATION ENGINEERING**  
**(PART TIME PROGRAMME)**

**SEMESTER I**

| Sr. No.              | Course Type | Subject Code | Course Title                               | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|--|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |  |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | BMA 509      | Numerical Methods and Computer Programming | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | ECE 527      | Advanced Soil Mechanics                    | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | ECE 529      | Earth Retaining Structures                 | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |  | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER II**

| Sr. No.              | Course Type | Subject Code | Course Title                  | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|-------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                               |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | ECE 526      | Stability of Slopes           | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | ECE 528      | Ground Improvement Techniques | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | BMA 512      | Advanced Mathematics          | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                               | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER III**

| Sr. No.              | Course Type | Subject Code | Course Title                    | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                                 |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | ECE 621      | Advanced Foundation Engineering | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC         | PEC I        | PEC I                           | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Seminar     | ECE 671      | Seminar                         | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                                 | <b>10</b>       |                 |    |     |       |     |            |

**SEMESTER IV**

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PEC          | PEC II       | PEC II       | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC          | PEC III      | PEC III      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Mini Project | ECE 680      | Mini Project | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>10</b>       |                 |    |     |       |     |            |

PCC-Programme Core course; PEC-Programme Elective Course



### SEMESTER V

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | ECE 691      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

### SEMESTER VI

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | ECE 692      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

**Total Programme Credits : 60**

ECE 691 Dissertation will have Internal Evaluation while ECE 692 Dissertation will have External Evaluation.

**DEPARTMENT OF CIVIL ENGINEERING**  
**LIST OF ELECTIVE COURSES**  
**M.TECH. SOIL MECHANICS AND FOUNDATION ENGINEERING**  
**(PART TIME PROGRAMME)**

**Programme Elective-I**

| <b>S. No.</b> | <b>Course Code</b> | <b>Course Name</b>                         | <b>Credits</b> |
|---------------|--------------------|--|----------------|
| 1.            | ECE 635            | Soil Structure Interaction Analysis        | 4(3-1-0)       |
| 2.            | ECE 637            | Earthquake Geotechnical Engineering        | 4(3-1-0)       |
| 3.            | ECE 639            | Finite Element in Geotechnical Engineering | 4(3-1-0)       |
| 4.            | ECE 641            | Design of Landfills                        | 4(3-1-0)       |
| 5.            | ECE 643            | Design of Special Foundations              | 4(3-1-0)       |
| 6.            | ECE 645            | Offshore Geotechnical Engineering          | 4(3-1-0)       |

**Programme Elective-II**

|    |         |   |          |
|----|---------|---|----------|
| 1. | ECE 646 | Rock Mechanics                                      | 4(3-1-0) |
| 2. | ECE 648 | Construction Techniques in Geotechnical Engineering | 4(3-1-0) |
| 3. | ECE 652 | Environmental Geo-technique                         | 4(3-1-0) |
| 4. | ECE 654 | Design of Earthen Dams                              | 4(3-1-0) |
| 5. | ECE 656 | Tunnel Engineering                                  | 4(3-1-0) |
| 6. | ECE 658 | Design of Substructures                             | 4(3-1-0) |

**Programme Elective-III**

|    |             |  |          |
|----|-------------|--|----------|
| 1. | ECE 660     | Soil Dynamics                                      | 4(3-1-0) |
| 2. | ECE 662     | Machine Foundations                                | 4(3-1-0) |
| 3. | ECE 627/628 | Structural Dynamics                                | 4(3-1-0) |
| 4. | ECE 666     | Remote Sensing and Geographical Information System | 4(3-1-0) |
| 5. | ECE 668     | Geo Environmental and Geo-Hazard Engineering       | 4(3-1-0) |
| 6. | ECE 634     | Finite Element Analysis                            | 4(3-1-0) |

**DEPARTMENT OF CIVIL ENGINEERING**  
**COURSE STRUCTURE & EVALUATION SCHEME**  
**M.TECH. STRUCTURAL ENGINEERING**  
**(PART TIME PROGRAMME)**

**SEMESTER I**

| Sr. No.              | Course Type | Subject Code | Course Title                                  | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |   |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | BMA 509      | Numerical Methods and Computer Programming    | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | ECE 523      | Limit State Analysis and Design of Structures | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | ECE 525      | Advanced Theory of Structures                 | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |   | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER II**

| Sr. No.              | Course Type | Subject Code | Course Title                                  | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |   |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | ECE 522      | Concrete Technology and Pre-stressed Concrete | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | ECE 524      | Earthquake analysis and Design of Structures  | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | BMA 512      | Advanced Mathematics                          | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |   | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER III**

| Sr. No.              | Course Type | Subject Code | Course Title                    | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                                 |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | ECE 621      | Advanced Foundation Engineering | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC         | PEC I        | PEC I                           | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Seminar     | ECE 671      | Seminar                         | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                                 | <b>10</b>       |                 |    |     |       |     |            |

**SEMESTER IV**

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PEC          | PEC II       | PEC II       | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC          | PEC III      | PEC III      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Mini Project | ECE 680      | Mini Project | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>10</b>       |                 |    |     |       |     |            |

PCC-Programme Core course; PEC-Programme Elective Course

### SEMESTER V

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | ECE 691      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

### SEMESTER VI

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | ECE 692      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

**Total Programme Credits : 60**

ECE 691 Dissertation will have Internal Evaluation while ECE 692 Dissertation will have External Evaluation.

**DEPARTMENT OF CIVIL ENGINEERING**  
**LIST OF ELECTIVE COURSES**  
**M.TECH. STRUCTURAL ENGINEERING**  
**(PART TIME PROGRAMME)**

**Programme Elective-I**

| <b>S. No.</b> | <b>Course Code</b> | <b>Course Name</b>                            | <b>Credits</b> |
|---------------|--------------------|---|----------------|
| 1.            | ECE 623            | Theory of Plates and Shells                   | 4(3-1-0)       |
| 2.            | ECE 625            | Reliability Analysis and Design of Structures | 4(3-1-0)       |
| 3.            | ECE 629            | Theory of Elasticity and Plasticity           | 4(3-1-0)       |
| 4.            | ECE 631            | Plastic Design of Steel Structures            | 4(3-1-0)       |
| 5.            | ECE 633            | Earthquake and Foundation Safety              | 4(3-1-0)       |

**Programme Elective-II**

|    |         |                                |          |
|----|---------|--------------------------------|----------|
| 1. | ECE 622 | Structural Fire Engineering    | 4(3-1-0) |
| 2. | ECE 624 | Computer Aided Design          | 4(3-1-0) |
| 3. | ECE 626 | Design of Tank and Reservoirs  | 4(3-1-0) |
| 4. | ECE 628 | Rehabilitation of Structures   | 4(3-1-0) |
| 5. | ECE 630 | Bridge Engineering             | 4(3-1-0) |
| 6. | ECE 632 | Design of Retaining Structures | 4(3-1-0) |

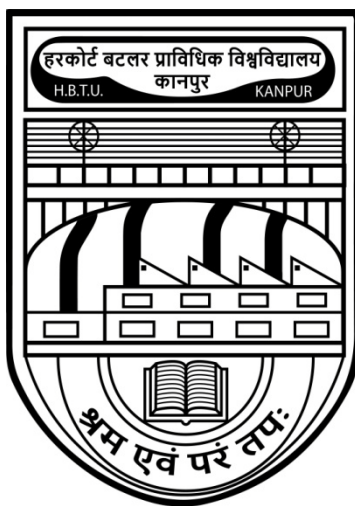
**Programme Elective-III**

|    |         |  |          |
|----|---------|--|----------|
| 1. | ECE 634 | Finite Element Analysis                | 4(3-1-0) |
| 2. | ECE 636 | Hydraulic Structures                   | 4(3-1-0) |
| 3. | ECE 638 | Design of Water and Wastewater Systems | 4(3-1-0) |
| 4. | ECE 640 | Disaster Management                    | 4(3-1-0) |
| 5. | ECE 642 | Prefabricated Construction Techniques  | 4(3-1-0) |
| 6. | ECE 644 | High Rise Structures                   | 4(3-1-0) |

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**MASTER OF TECHNOLOGY  
CHEMICAL ENGINEERING**

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**HARCOURT BUTLER TECHNICAL UNIVERSITY  
KANPUR-208002 (UP) – INDIA**

**DEPARTMENT OF CHEMICAL ENGINEERING**  
**COURSE STRUCTURE & EVALUATION SCHEME**  
**M.TECH. CHEMICAL ENGINEERING**  
**(PART TIME PROGRAMME)**

**SEMESTER I**

| Sr. No.              | Course Type | Subject Code | Course Title                                    | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |   |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | TCH 501      | Advanced Mathematical Methods in Chemical Engg. | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | TCH 503      | Advanced Chemical Engineering Thermodynamics    | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | TCH 505      | Advanced Chemical Reaction Engineering          | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |   | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER II**

| Sr. No.              | Course Type | Subject Code | Course Title                       | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|------------------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                                    |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | TCH 502      | Advanced Transport Phenomena       | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | TCH 504      | Advanced Separation Processes      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | TCH 506      | Optimization of Chemical Processes | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                                    | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER III**

| Sr. No.              | Course Type | Subject Code | Course Title                                  | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|---|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |   |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | TCH 601      | Modeling and Simulation of Chemical Processes | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC         | PEC I        | PEC-I   | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
|                      | Seminar     | TCH 671      | Seminar                                       | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |   | <b>10</b>       |                 |    |     |       |     |            |

**SEMESTER IV**

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PEC          | PEC II       | PEC II       | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC          | PEC III      | PEC III      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Mini Project | TCH 680      | Mini Project | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>10</b>       |                 |    |     |       |     |            |

PCC-Programme Core course; PEC-Programme Elective Course

### SEMESTER IV

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | TCH 691      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

### SEMESTER IV

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | TCH 692      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

**Total Programme Credits : 60**

TCH 691 Dissertation will have Internal Evaluation while TCH 692 Dissertation will have External Evaluation.



**DEPARTMENT OF CHEMICAL ENGINEERING**  
**LIST OF ELECTIVE COURSES**  
**M.TECH. CHEMICAL ENGINEERING**  
**(PART TIME PROGRAMME)**

**Programme Elective-I**

| <b>S. No.</b> | <b>Course Code</b> | <b>Course Name</b>                   | <b>Credits</b> |
|---------------|--------------------|--------------------------------------|----------------|
| 1.            | TCH 621            | Air Pollution Monitoring and Control | 4 (3-1-0)      |
| 2.            | TCH 623            | Safety Hazard and Risk Analysis      | 4 (3-1-0)      |
| 3.            | TCH 625            | Instrumental Methods of Analysis     | 4 (3-1-0)      |
| 4.            | TCH 627            | Advanced Petroleum Refining          | 4 (3-1-0)      |

**Programme Elective-II**

|    |         |   |           |
|----|---------|---|-----------|
| 1. | TCH 622 | Advanced Process Control                    | 4 (3-1-0) |
| 2. | TCH 624 | Statistical Design of Experiments           | 4 (3-1-0) |
| 3. | TCH 626 | Design of Piping System for Chemical Plants | 4 (3-1-0) |
| 4. | TCH 628 | Water Pollution Monitoring and Control      | 4 (3-1-0) |

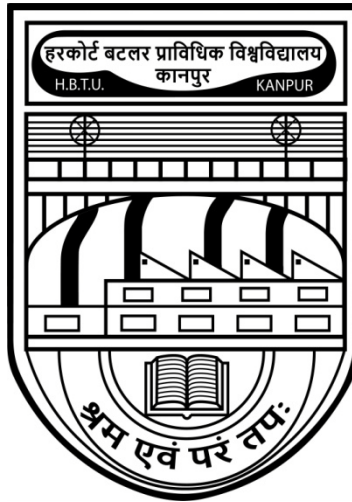
**Programme Elective-III**

|    |         |                                   |           |
|----|---------|-----------------------------------|-----------|
| 1. | TCH 630 | Principles of Polymer Engineering | 4 (3-1-0) |
| 2. | TCH 632 | Solar Thermal Energy Storage      | 4 (3-1-0) |
| 3. | TCH 634 | Nano Technology                   | 4 (3-1-0) |
| 4. | TCH 636 | Natural Gas Engineering           | 4 (3-1-0) |

**SEMESTER WISE COURSE STRUCTURE  
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**DEPARTMENT OF ELECTRICAL ENGINEERING  
 COURSE STRUCTURE & EVALUATION SCHEME  
 M.TECH. ELECTRICAL ENGINEERING  
 (PART TIME PROGRAMME)**

**SEMESTER I**

| Sr. No.              | Course Type | Subject Code | Course Title               | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|----------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                            |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EEE 501      | Advanced Power Electronics | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | EEE 503      | Advanced Control System    | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | EEE 505      | EHV AC & DC Transmission   | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                            | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER II**

| Sr. No.              | Course Type | Subject Code | Course Title                                 | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|--|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |  |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EEE 502      | Industrial Drives and Automation             | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PCC         | EEE 504      | Intelligent Techniques and Applications      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | PCC         | EEE 506      | Advanced Microprocessor and Microcontrollers | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |  | <b>12</b>       |                 |    |     |       |     |            |

**SEMESTER III**

| Sr. No.              | Course Type | Subject Code | Course Title            | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|-------------|--------------|-------------------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |             |              |                         |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PCC         | EEE 601      | Modeling and Simulation | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC         | PEC I        | PEC-I                   | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
|                      | Seminar     | TCH 671      | Seminar                 | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |             |              |                         | <b>10</b>       |                 |    |     |       |     |            |

**SEMESTER IV**

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | PEC          | PEC II       | PEC II       | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 2.                   | PEC          | PEC III      | PEC III      | 4(3-1-0)        | 30              | 20 | -   | 50    | 50  | 100        |
| 3.                   | Mini Project | EEE 680      | Mini Project | 2(0-0-4)        | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>10</b>       |                 |    |     |       |     |            |

PCC-Programme Core course; PEC-Programme Elective Course

### SEMESTER V

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | EEE 691      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

### SEMESTER VI

| Sr. No.              | Course Type  | Subject Code | Course Title | Credits (L-T-P) | Sessional Marks |    |     |       | ESM | Total Mark |
|----------------------|--------------|--------------|--------------|-----------------|-----------------|----|-----|-------|-----|------------|
|                      |              |              |              |                 | MSE             | TA | Lab | Total |     |            |
| 1.                   | Dissertation | EEE 692      | Dissertation | 8(0-0-16)       | -               | 50 | -   | 50    | 50  | 100        |
| <b>Total Credits</b> |              |              |              | <b>08</b>       |                 |    |     |       |     |            |

**Total Programme Credits : 60**

EEE 691 Dissertation will have Internal Evaluation while EEE 692 Dissertation will have External Evaluation.

**DEPARTMENT OF ELECTRICAL ENGINEERING**  
**LIST OF ELECTIVE COURSES**  
**M.TECH. ELECTRICAL ENGINEERING**  
**(PART TIME PROGRAMME)**

**Programme Elective-I**

| <b>S. No.</b> | <b>Course Code</b> | <b>Course Name</b>                 | <b>Credits</b> |
|---------------|--------------------|------------------------------------|----------------|
| 1.            | EEE 611            | Special Electrical Machines        | 4 (3-1-0)      |
| 2.            | EEE 613            | Computer Methods in Power System   | 4 (3-1-0)      |
| 3.            | EEE 615            | Virtual Instrumentation            | 4 (3-1-0)      |
| 4.            | EEE 617            | Advanced Digital Signal Processing | 4 (3-1-0)      |
| 5.            | EEE 619            | Real Time Instrumentation          | 4 (3-1-0)      |

**Programme Elective-II**

|    |         |  |           |
|----|---------|--|-----------|
| 1. | EEE 620 | Power Quality and FACTS Devices              | 4 (3-1-0) |
| 2. | EEE 622 | Embedded Systems                             | 4 (3-1-0) |
| 3. | EEE 624 | Biomedical Instrumentation                   | 4 (3-1-0) |
| 4. | EEE 626 | Digital Control Systems                      | 4 (3-1-0) |
| 5. | EEE 628 | Modeling and Dynamics of Electrical Machines | 4 (3-1-0) |

**Programme Elective-III**

|    |         |   |           |
|----|---------|---|-----------|
| 1. | EEE 640 | Non-conventional Energy Sources and Energy Converters | 4 (3-1-0) |
| 2. | EEE 642 | SCADA and Distributed Control Systems                 | 4 (3-1-0) |
| 3. | EEE 644 | Load and Energy Management                            | 4 (3-1-0) |
| 4. | EEE 646 | Robotics  | 4 (3-1-0) |
| 5. | EEE 648 | Power System Security and Analysis                    | 4 (3-1-0) |