

शैक्षणिक मामलों के डीन का कार्यालय  
OFFICE OF DEAN ACADEMIC AFFAIRS  
राष्ट्रीय प्रौद्योगिकी संस्थान श्रीनगर

**NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR**

(शिक्षा मंत्रालय, भारत सरकार के तत्वावधान में राष्ट्रीय महत्व का एक स्वायत्त संस्थान)  
(An autonomous Institute of National Importance under the aegis of Ministry of Education, Govt. of India)

हज़रतबल, श्रीनगर, जम्मू और कश्मीर, 190006, भारत  
HAZRATBAL, SRINAGAR JAMMU and KASHMIR, 190006, INDIA

# SCHEME OF COURSES for B.TECH., (1<sup>st</sup> to 8<sup>th</sup>) Semester (Batch-2023 Onwards)



**1<sup>st</sup> Semester (Group A)**  
**Civil/ Mechanical/ Chemical/ Mett. & Mat Science**

| S. No      | Course Code   | Course Title                                    | Department Offering    | Credit    | Contact Hours |          |           |           |
|------------|---------------|---|------------------------|-----------|---------------|----------|-----------|-----------|
|            |               |   |                        |           | L             | T        | P         | Total     |
| A11        | HST101        | Basic English and Communication Skills          | Humanities             | 3         | 2             | 1        | 0         | 3         |
| A12        | MAT101        | Mathematics I                                   | Mathematics            | 3         | 2             | 1        | 0         | 3         |
| A13        | EET101        | Basic Electrical Engineering                    | Electrical             | 3         | 2             | 1        | 0         | 3         |
| A14        | ITT101        | Computer Programming                            | Information Technology | 3         | 2             | 1        | 0         | 3         |
| A15        | CHT101        | Engineering Chemistry                           | Chemistry              | 3         | 2             | 1        | 0         | 3         |
| A16        | CVT102        | Engineering Drawing                             | Civil                  | 3         | 1             | 0        | 4         | 5         |
| A17        | CHL101        | Chemistry Laboratory                            | Chemistry              | 1         | 0             | 0        | 2         | 2         |
| A18        | ITL101        | Computer Programming Laboratory                 | Information Technology | 1         | 0             | 0        | 2         | 2         |
| <b>A10</b> | <b>NBA101</b> | <b>Fundamental Knowledge of Accreditation**</b> | <b>NBA Instt. Cell</b> | <b>0</b>  | <b>2</b>      | <b>0</b> | <b>0</b>  | <b>2</b>  |
|            |               | <b>Total</b>                                    |                        | <b>20</b> | <b>13</b>     | <b>5</b> | <b>10</b> | <b>26</b> |

\*\* Compulsory Audit Course

**1<sup>st</sup> Semester (Group B)**  
**Electrical/ Electronics & Comm. /Computer Science / Information Technology**

| S. No | Course Code | Course Title                             | Department Offering | Credit    | Contact Hours |          |          |           |
|-------|-------------|--|---------------------|-----------|---------------|----------|----------|-----------|
|       |             |  |                     |           | L             | T        | P        | Total     |
| B11   | HST101      | Basic English and Communication Skills   | Humanities          | 3         | 2             | 1        | 0        | 3         |
| B12   | MAT101      | Mathematics I                            | Mathematics         | 3         | 2             | 1        | 0        | 3         |
| B13   | MET101      | Elements of Mechanical Engineering       | Mechanical          | 3         | 2             | 1        | 0        | 3         |
| B14   | PHT101      | Engineering Physics                      | Physics             | 3         | 2             | 1        | 0        | 3         |
| B15   | CHT102      | Environmental Studies                    | Chemistry           | 3         | 2             | 1        | 0        | 3         |
| B16   | CVT102      | Engineering Mechanics                    | Civil               | 3         | 2             | 1        | 0        | 3         |
| B17   | HSL101      | English Language Laboratory              | Humanities          | 1         | 0             | 0        | 2        | 2         |
| B18   | PHL101      | Engineering & Applied Physics Laboratory | Physics             | 1         | 0             | 0        | 2        | 2         |
| B19   | WSL101      | Workshop Practice                        | Workshop            | 2         | 0             | 0        | 4        | 4         |
|       |             | <b>Total</b>                             |                     | <b>22</b> | <b>12</b>     | <b>6</b> | <b>8</b> | <b>26</b> |



# National Institute of Technology Srinagar

## 2<sup>nd</sup>Semester (Group A)

### Civil/ Mechanical/ Chemical/ Mett. & Mat Science

| S. No | Course Code | Course Title                             | Department Offering | Credit    | Contact Hours |          |          |           |
|-------|-------------|--|---------------------|-----------|---------------|----------|----------|-----------|
|       |             |  |                     |           | L             | T        | P        | Total     |
| A21   | HST102      | Advanced English and Comm. Skills        | Humanities          | 3         | 2             | 1        | 0        | 3         |
| A22   | MAT102      | Mathematics II                           | Mathematics         | 3         | 2             | 1        | 0        | 3         |
| A23   | MET101      | Elements of Mechanical Engineering       | Mechanical          | 3         | 2             | 1        | 0        | 3         |
| A24   | PHT101      | Engineering Physics                      | Physics             | 3         | 2             | 1        | 0        | 3         |
| A25   | CHT102      | Environmental Studies                    | Chemistry           | 3         | 2             | 1        | 0        | 3         |
| A26   | CVT101      | Engineering Mechanics                    | Civil               | 3         | 2             | 1        | 0        | 3         |
| A27   | HSL101      | English Language Laboratory              | Humanities          | 1         | 0             | 0        | 2        | 2         |
| A28   | PHL101      | Engineering & Applied Physics Laboratory | Physics             | 1         | 0             | 0        | 2        | 2         |
| A29   | WSL101      | Workshop Practice                        | Workshop            | 2         | 0             | 0        | 4        | 4         |
|       |             | <b>Total</b>                             |                     | <b>22</b> | <b>12</b>     | <b>6</b> | <b>8</b> | <b>26</b> |

## 2<sup>nd</sup>Semester (Group B)

### Electrical/ Electronics & Comm. /Computer Science / Information Technology

| S. No      | Course Code   | Course Title                                    | Department Offering    | Credit    | Contact Hours |          |          |           |
|------------|---------------|---|------------------------|-----------|---------------|----------|----------|-----------|
|            |               |   |                        |           | L             | T        | P        | Total     |
| B21        | HST102        | Advanced English and Comm. Skills               | Humanities             | 3         | 2             | 1        | 0        | 3         |
| B22        | MAT102        | Mathematics II                                  | Mathematics            | 3         | 2             | 1        | 0        | 3         |
| AB23       | EET101        | Basic Electrical Engineering                    | Electrical             | 3         | 2             | 1        | 0        | 3         |
| B24        | ITT101        | Computer Programming                            | Information Technology | 3         | 2             | 1        | 0        | 3         |
| B25        | CHT101        | Engineering Chemistry                           | Chemistry              | 3         | 2             | 1        | 0        | 3         |
| B26        | CVT102        | Engineering Drawing                             | Civil                  | 3         | 1             | 0        | 4        | 5         |
| B27        | CHL101        | Chemistry Laboratory                            | Chemistry              | 1         | 0             | 0        | 2        | 2         |
| B28        | ITL101        | Computer Programming Laboratory                 | Information Technology | 1         | 0             | 0        | 2        | 2         |
| <b>A10</b> | <b>NBA101</b> | <b>Fundamental Knowledge of Accreditation**</b> | <b>NBA Instt. Cell</b> | <b>0</b>  | <b>2</b>      | <b>0</b> | <b>0</b> | <b>2</b>  |
|            |               | <b>Total</b>                                    |                        | <b>20</b> | <b>13</b>     | <b>5</b> | <b>8</b> | <b>26</b> |

\*\* Compulsory Audit Course



| Year (Semester)                                 | Course Title                           | Course Code | L-T-P-Credits |
|---|--|-------------|---------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> Semester) | Basic English and Communication Skills | HST 101     | 3-0-0-3       |

|                          |                 |                            |                 |
|--------------------------|-----------------|----------------------------|-----------------|
| <b>Evaluation Policy</b> | <b>Mid-Term</b> | <b>Internal Assessment</b> | <b>End-Term</b> |
|                          | 26 Marks        | 24 Marks                   | 50 Marks        |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes  | Bloom's Taxonomy Level |
|------------|--|------------------------|
| <b>CO1</b> | Make use of correct use of basic English phonetics.                            | 3                      |
| <b>CO2</b> | Apply the vocabulary and grammar components properly in English communication. | 3                      |
| <b>CO3</b> | Importance of effective reading and comprehension skills.                      | 5                      |
| <b>CO4</b> | Compose paragraphs and essays using the formal writing strategies.             | 6                      |

**Detailed Syllabus:**

| Module No.      | Contents  | Hours      |
|-----------------|---|------------|
| <b>Module 1</b> | <b>English Phonetics</b><br>Sounds/Phonemes of English (Vowels and Consonants)<br>Phonemic Transcription of Simple Words<br>Syllable Structure<br>Word Stress   | (10 Hours) |
| <b>Module 2</b> | <b>Vocabulary and Grammar</b><br>Word Formation (Prefixes and Suffixes) [Textbook Pages 4-8 and 57-62]<br>Synonyms and Antonyms [Textbook Pages 33-35]<br>Articles, Prepositions [Textbook Pages 8-15, 112-113, and 127-129]<br>Punctuation [Textbook Pages 19-22]      | (11 Hours) |
| <b>Module 3</b> | <b>Reading</b><br>Techniques for Good Comprehension [Textbook Pages 40-42]<br>Skimming and Scanning [Textbook Pages 71-75]<br>Local and Global Comprehension [Textbook Pages 92-95]<br>Reading Prescribed Comprehension Passages [Textbook Pages 1-4, 29-33, and 40-42] | (10 Hours) |
| <b>Module 4</b> | <b>Writing</b><br>Phrases and Clauses [Textbook Pages 16-19]<br>Redundancies and Clichés [Textbook Pages 89-92 and 116]<br>Paragraph Writing [Textbook Pages 23-28 and 76-84]<br>Essay Writing [Textbook Pages 98-102]  | (11 Hours) |

**Books Recommended:**

1. N. P. Sudharshana and C. Savitha, *English for Engineers*, Cambridge, 2018.
2. [dictionary.cambridge.org/help/phonetics.html](http://dictionary.cambridge.org/help/phonetics.html) [For Unit1, Sounds of English]
3. [howjsay.com/](http://howjsay.com/) [For Unit1, Transcription/Pronunciation]
4. [myenglishlanguage.com/linguistics-language-guide/english-phonology/syllables-and-stress/](http://myenglishlanguage.com/linguistics-language-guide/english-phonology/syllables-and-stress/) [For Unit 1, Syllable and Stress]

| Year (Semester)   | Course Title    | Course Code                | L-T-P-Credits   |
|---|-----------------|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> & 2 <sup>nd</sup> Semester) | Mathematics-I   | MAT-101                    | 3-0-0-3         |
| <b>Evaluation Policy</b>  | <b>Mid-Term</b> | <b>Internal Assessment</b> | <b>End-Term</b> |

|  |          |          |          |
|--|----------|----------|----------|
|  | 26 Marks | 24 Marks | 50 Marks |
|--|----------|----------|----------|

**Pre-requisites:** A student should have basic knowledge of differential calculus and matrices.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No. | Course Outcomes   | Bloom's Taxonomy Level |
|--------|---|------------------------|
| C01    | Solve linear and nonlinear differential equations by various methods  | 3                      |
| C02    | Apply ordinary differential equations for solving various problems.   | 3                      |
| C03    | Examine the problems related to rank of matrix, Cayley-Hamilton theorem, solutions of equations by matrix method. | 4                      |
| C04    | Estimate eigen values, eigen vectors and quadratic forms.   | 5                      |

**Detailed Syllabus:**

| Module No. | Contents   | Hours |
|------------|--|-------|
| Module 1   | Exact differential equations, Necessary and sufficient condition for exact differential equations, Equations reducible to exact form, Linear differential equations of second and higher order with constant and variable coefficients, Cauchy's Homogeneous Linear equation, Legendre's linear equation, Simultaneous differential equations of first and second order, Simultaneous differential equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ , Nonlinear differential equation. | 12    |
| Module 2   | Method of Variation of parameters, Method of undetermined coefficients, Series solution of ordinary differential equations (Frobenius method). Applications of ordinary differential equations viz. law of growth and decay, Newton's law of cooling, Electric circuits, Chemical reaction and solutions.  | 12    |
| Module 3   | Rank of a matrix, Equivalent matrices, Elementary transformations, normal form, Inverse of a matrix, Cayley- Hamilton theorem, Applications of Cayley-Hamilton theorem for finding Inverse and higher powers of a matrix, Solution of simultaneous equations by elementary operations, Similar matrices.   | 10    |
| Module 4   | Special matrices viz. orthogonal matrix, Idempotent matrix, unitary matrix. Eigen values and Eigen vectors of a matrix, Properties of eigenvalues and eigenvectors. Quadratic forms, Value class of quadratic form   | 8     |

**Books Recommended:**

1. Jain, R.K and Iyengar, S.R.K.(2008) .*Advanced Engineering Mathematics*, Third Edition, Narosa Pub. House.
2. Kreyszig, E. (2006).*Advanced Engineering Mathematics*, 9<sup>th</sup> Edition, John Wiley Sons.
3. Piaggio, H.T.H. *Differential Equations*, CBS publishers.

| Year (Semester) | Course Title | Course Code | L-T-P-Credits |
|-----------------|--------------|-------------|---------------|
|-----------------|--------------|-------------|---------------|

|   |                              |                            |                 |
|---|------------------------------|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> & 2 <sup>nd</sup> Semester) | Basic Electrical Engineering | EET101                     | 3-0-0-3         |
| <b>Evaluation Policy</b>  | <b>Mid-Term</b>              | <b>Internal Assessment</b> | <b>End-Term</b> |
|   | 26 Marks                     | 24 Marks                   | 50 Marks        |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes  | Bloom's Taxonomy Level |
|------------|--|------------------------|
| <b>CO1</b> | Develop a comprehensive understanding of DC circuits and their elements through application of KVL/KCL and various network theorems. | 3                      |
| <b>CO2</b> | Analyse and evaluate AC circuits, calculate Power in AC Circuits, and have a basic understanding of three phase circuits.            | 4                      |
| <b>CO3</b> | Assess the working principle and characteristics of transformers & evaluate performance indices of transformers.                     | 5                      |
| <b>CO4</b> | Examine the working principles of various DC & AC machines and acquire working knowledge of basic measurement instruments.           | 4                      |

**Detailed Syllabus:**

| Module No.      | Contents   | Hours     |
|-----------------|--|-----------|
| <b>Module 1</b> | <b>DC Circuits:</b> Introduction to Electric Circuits and their Elements, Energy Sources & their types (Ideal/Practical & Dependent/Independent Sources), Kirchhoff's Voltage & Current laws, Nodal Analysis, Mesh Analysis, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power Transfer theorem, Star-Delta Transformation. | <b>10</b> |
| <b>Module 2</b> | <b>AC Circuits:</b> Introduction to AC circuits and Sinusoidal Signals, Phasor representation, Concept of Impedance. Instantaneous, Active, and Reactive Power, Concept of Power factor. Introduction to Three Phase circuits.   | <b>8</b>  |
| <b>Module 3</b> | <b>Transformers:</b> Introduction to Transformers and their working principle, Ideal & Practical Transformers, Equivalent circuit, and Phasor diagram. Losses & Efficiency.  | <b>8</b>  |
| <b>Module 4</b> | <b>Machines:</b> Introduction to Electric Machines.<br><b>DC Machines:</b> Construction, Principle of Operation, EMF and Torque Equations, Characteristics of DC Generators and Motors.<br><b>Induction Motors:</b> Production of Rotating Magnetic Field, Principle of Operation of 3- $\phi$ I.M., Torque-Speed Characteristics of 3- $\phi$ I.M.  | <b>10</b> |
| <b>Module 5</b> | <b>Measuring Instruments:</b> Basic Terminology associated with Measurement. Measurement of Current, Voltage, Resistance & Power. Sensors & Transducers.   | <b>6</b>  |
| <b>Total</b>    |  | <b>42</b> |

**Books Recommended:**

1. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd Edition, PHI, 2003.
2. Edward Hughes, Electrical Technology, 10th Edition, ELBS, 2010.
3. V.N. Mittle, Basic Electrical Engineering, TMH, 2000.

| Year (Semester)   | Course Title         | Course Code         | L-T-P-Credits |
|---|----------------------|---------------------|---------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> & 2 <sup>nd</sup> Semester) | Computer Programming | ITT101              | 3-0-0-3       |
| Evaluation Policy   | Mid-Term             | Internal Assessment | End-Term      |
|   | 26 Marks             | 24 Marks            | 50 Marks      |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No. | Course Outcomes   | Bloom's Taxonomy Level |
|--------|---|------------------------|
| CO1    | Apply programming for problem-solving and use various library functions, data types, characters, keywords and operators of the 'C' language | 3                      |
| CO2    | Analyze and apply the concept of conditional and iterative statements in C language and use of functions.                                   | 4                      |
| CO3    | Evaluate the data types offered by the C language including complex data types: arrays, structures, pointers, and unions.                   | 5                      |
| CO4    | Analyze the dynamic behavior of memory and implement the file handling concept in C programming.  | 4                      |

**Detailed Syllabus:**

|                 |   |           |
|-----------------|---|-----------|
| <b>Module 1</b> | <p><b>Introduction to Problem-Solving:</b> Engineering problem-solving methodology, Flowcharts and Algorithms, Need for computer Languages, High-level languages, History of C, Memory Layout of a C Program, GCC compiler</p> <p><b>Language of Bits:</b> Binary Representation of Data, 1's and 2's complement representation, Computer Arithmetic, Octal and HexaDecimal Representation.</p> <p><b>Fundamentals of C:</b> Program structure, C character set, Library functions, Preprocessors Directives, Compilation Flow of a C program, I/O functions in C, Comments, Header Files, C character set, data types, identifiers and keywords, Declarations, Operators and expressions, Type Conversion, Precedence and Associativity.</p> | <b>8</b>  |
| <b>Module 2</b> | <p><b>Decision Control Structure in C:</b> Decision-making statements(if, if-else,if-else-if, switch), nesting of decision control structures.</p> <p><b>Loop Control Structure in C:</b> Looping Statements(while, do-while, for), nested loop, use of jumping statements(break, continue, goto).</p> <p><b>Functions:</b> Concept of library functions, user-defined functions, passing arguments, Function prototypes, Calling a function, Static functions, Recursion.</p>  | <b>13</b> |
| <b>Module 3</b> | <p><b>Arrays and String:</b> Declaration and initialization, Passing arrays to a function, matrices as 2D arrays, Multi-dimensional arrays, string handling library functions.</p> <p><b>Pointers:</b> Declarations, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays, Arrays of pointers, and function pointers.</p> <p><b>Structures and Unions:</b> Defining and accessing structure, structure as function arguments, an array of structures, pointers to structures, defining and accessing union.</p>  | <b>13</b> |
| <b>Module 4</b> | <p><b>Dynamic Memory Allocation:</b> Introduction to dynamic memory allocation(malloc, calloc, realloc, free).</p> <p><b>File Handling:</b> File operation such as storing, retrieving and updating a file.</p>   | <b>8</b>  |

**Books Recommended:**

1. Schaums Outline of Theory and Problems of programming with C: Gottfried
2. Programming with C , Byron Gottfried, Third Edition. (McGrawHill).
3. Mastering C by Venugopal, Prasad – TMH
4. Programming in ANSI C, Balaguruswamy
5. C How to Program, P. J. Deitel and H. Deitel

**Other Books Recommended:**

1. Complete reference with C Tata McGraw Hill
2. Engineering Problem Solving with ANSI C, Delores M. Etter, Prentice Hall
3. C Programming, Ivor Horton, Wrox Press Limited
4. The C programming language: Kernighan and Ritchie



| Year (Semester)   | Course Title          | Course Code                | L-T-P-Credits   |
|---|-----------------------|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Engineering Chemistry | CHT-101                    | 3-1-0-4         |
| Evaluation Policy   | <b>Mid-Term</b>       | <b>Internal Assessment</b> | <b>End-Term</b> |
|   | 26 Marks              | 24 Marks                   | 50 Marks        |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No. | Course Outcomes  | Bloom's Taxonomy Level |
|--------|--|------------------------|
| CO1    | Analyze the properties and use of polymeric and nanomaterials. | 4                      |
| CO2    | Evaluate the basic concepts of water treatment.                | 5                      |
| CO3    | Identify the fuels and their applications.                     | 3                      |
| CO4    | Importance of lubricants and corrosion.                        | 5                      |

**Detailed Syllabus:**

| Module No.      | Contents   | Hours     |
|-----------------|--|-----------|
| <b>Module 1</b> | <p><b>Engineering materials</b></p> <p><b>Polymers:</b> Introduction, classification, types of polymerization, mechanisms of polymerization (free radical, cationic, anionic), coordination polymerization and its mechanism, synthesis and applications of some important engineering polymers (Polyethylene, PVC, Teflon, Terylene, Nylon-6, Nylon-6,6), Conducting polymers; classifications, properties and applications in engineering field.</p> <p><b>Nanomaterials:</b> Introduction, Classification of nanomaterials based on their size, Approaches for nanomaterials synthesis (Bottom-up approach: Sol-gel synthesis, Hydrothermal growth and chemical vapor deposition. Top-down approach: Ball Milling and Micro-fabrication), Applications of nanotechnology in various fields.</p> | <b>12</b> |
| <b>Module 2</b> | <p><b>Water treatment</b></p> <p>Introduction, Impurities in water, Hard water, Determination of hardness and alkalinity, Softening of hard water (Lime-Soda process, Zeolite process and Ion Exchange process), municipal treatment of water for drinking purposes; removal of suspended, dissolved and biological impurities-Sterilization by chlorination (Effective and break-point chlorination). Numerical problems based on hardness, alkalinity and LS process.</p>  | <b>10</b> |
| <b>Module 3</b> | <p><b>Fuels</b></p> <p>Introduction, Classification, Calorific value (HCV and LCV), Determination of calorific value using Bomb calorimeter, Numerical problems based on Dulong's formula. Biofuels: Classification of biofuels; first, second, third and fourth generation biofuels. Properties and characteristics of liquid biofuels (bioethanol, biobutanol and biodiesel).</p>  | <b>10</b> |
| <b>Module 4</b> | <p><b>Lubricants and Corrosion</b></p> <p><b>Lubricants:</b> Introduction, mechanisms of lubrication, hydrodynamic, boundary and extreme pressure lubrication, classification of lubricants: liquid, semi solid and solid lubricants. Lubricating oils; fatty oils, mineral oils, blended oils, synthetic oils, properties of lubricating oils with special reference to flash point, aniline point, viscosity and viscosity index.</p> <p><b>Corrosion:</b> Introduction, types of corrosion: Dry and wet corrosion (pitting</p>  | <b>10</b> |

|   |
|---|
| corrosion, crevice corrosion, and stress corrosion), corrosion prevention and control by proper design and material selection, cathodic protection, anodic protection, protective coatings. |
|---|

**Books Recommended:**

1. Jain P.C., Jain M., Engineering Chemistry, Dhanpat Rai Publishing Company, 17<sup>th</sup> Edition, 2019.
2. Dara S.S., Umare S.S., A Text Book of Engineering Chemistry, S. Chand Publication, 1<sup>st</sup> Edition, 2004.
3. Viaram S., Engineering Chemistry, Wiley Publication, 1<sup>st</sup> Edition, 2017.
4. Rao M.S.R., Singh S., Nanoscience and Nanotechnology: Fundamentals to Frontiers, Wiley Publication, 1<sup>st</sup> edition, 2014.
5. Roussak O.V., Gesser H.D., Applied Chemistry: For Engineers and Technologist, 2<sup>nd</sup> Edition, 2013.
6. Gowariker V.R., Viswanathan N.V., Sreedhar J., Polymer Science, New Age International Publisher, 3<sup>rd</sup> Edition, 2019.
7. Agarwal C.V., Murthy C.P., Naidu A., Chemistry of Engineering Materials, B.S. Publication, 9<sup>th</sup> Edition, 2018.
8. Cademartiri L., Ozin G. A., Lehn J. M., Concepts of Nanochemistry, Wiley-VCH Publication, 1<sup>st</sup> Edition, 2009.



| Year (Semester)   | Course Title        | Course Code                | L-T-P-Credits   |
|---|---------------------|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Engineering Drawing | CVT-101                    | 1-0-4-3         |
| Evaluation Policy   | <b>Mid-Term</b>     | <b>Internal Assessment</b> | <b>End-Term</b> |
|   | 26 Marks            | 24 Marks                   | 50 Marks        |

### Course Objective:

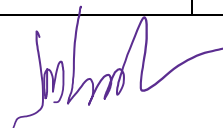
To inculcate the ability to translate geometric and topological information of common engineering objects (two/three dimensional) into engineering drawing using standard graphical techniques.

### Course Outcomes:

| CO NOs     | Course Outcomes  | Bloom's Taxonomy Level |
|------------|--|------------------------|
| <b>CO1</b> | Apply the concepts of projection of points, lines and solids to develop real world objects | 3                      |
| <b>CO2</b> | Analyze different sectional views of simple geometrical solids                             | 4                      |
| <b>CO3</b> | Perceive the intersection and development of surfaces of simple solids                     | 5                      |
| <b>CO4</b> | Imagine and construct orthographic, Isometric, and Perspective views of objects.           | 6                      |

### Syllabus

| Unit          | Course Contents   | Contact Hours |
|---------------|---|---------------|
| <b>Unit 1</b> | <b>Introduction to Engineering Drawing:</b> Basic principles of Engineering Drawing, Stationary requirements, drawing instruments, lettering, dimensioning, layout<br><br><b>Scales:</b> Representation of scales, units of measurement, representative fraction, types of scales<br><br><b>Types of projections:</b> Concept of first angle and third angle projections, concepts of projection of points, lines, and planes | <b>20</b>     |
| <b>Unit 2</b> | <b>Introduction to 3D objects:</b> Construction of different views of simple geometrical solids using first angle projection<br><br><b>Sections:</b> Types of sectional planes, true shapes of sections   | <b>20</b>     |
| <b>Unit 3</b> | <b>Intersection of surfaces:</b> simple case of intersection of two prisms, two cylinders, and cone and a cylinder.<br><br><b>Development of surfaces:</b> Development of surfaces of sections of solids and simple intersecting solids.  | <b>15</b>     |



|               |   |           |
|---------------|---|-----------|
| <b>Unit 4</b> | <b>Isometric views:</b> Development isometric views of simple blocks using orthographic third angle projections | <b>15</b> |
|---------------|---|-----------|

**Text book:**

1. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010.

**References:**

1. Gopalakrishna K. R., “Engineering Drawing” (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
2. Shah M. B., and Rana B. C., “Engineering Drawing”, Pearson, 2nd Edition, 2009.
3. Luzzader, Warren. J. and Duff, J. M., “Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Venugopal K. and Prabhu R. V., “Engineering Graphics”, New Age International (P) Limited, 2008.
5. Natrajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2009.
6. Basant A. and Agarwal C. M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. Gowri S., and Jeyapoovan T., “Engineering Graphics” Vikas Publishing House (P) Limited, 2011.



| Year (Semester)   | Course Title          | Course Code | L-T-P-Credits |
|---|-----------------------|-------------|---------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Chemistry Laboratory  | CHL 101     | 0-0-2-1       |
| Evaluation Policy   | Continuous Assessment |             | End-Term      |
|   | 60 Marks              |             | 40 Marks      |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No. | Course Outcomes                                      | Bloom's Taxonomy Level |
|--------|--|------------------------|
| CO1    | Assessment of different parameters of water quality. | 5                      |
| CO2    | Experiment with synthesis of polymeric materials.    | 3                      |
| CO3    | Analysis of fuels and lubricants.                    | 4                      |
| CO4    | Make use of instruments for chemical analysis.       | 3                      |

**Detailed Syllabus:**

| Module No. | Contents  | Hours |
|------------|---|-------|
| Module 1   | 1. To determine the total, permanent and temporary hardness of water by EDTA method.<br>2. To determine alkalinity of given water samples/alkali mixtures by warder's Method.<br>3. To estimate percentage of available chlorine (free chlorine) in bleaching powder/water. | 08    |
| Module 2   | 1. Synthesis of Urea formaldehyde resin.<br>2. Synthesis of Phenol formaldehyde resin. (Demonstration)  | 04    |
| Module 3   | 1. Proximate analysis of coal.<br>2. To determine the acid value of given lubricating oil.<br>3. To determine the aniline point of given lubricating oil.<br>4. Estimation of viscosity of lubricating oil by viscometer.   | 10    |
| Module 4   | 1. Estimation of strength of HCl by pH Meter. (Demonstration)<br>2. To verify Beer-Lambert law for coloured solution and to determine the concentration of a given unknown solution. (Demonstration).   | 06    |

**Books Recommended:**

- Dara S.S., A Textbook on Experiments and Calculations in Engineering Chemistry, S Chand & Company Publication, 9<sup>th</sup> Edition, 2015
- Mangla B., Sachdeva R., Sethi B., Engineering Practical Chemistry, Manakin Press, 1<sup>st</sup> Edition, 2018.
- Rattan S., Theory and Practicals of Engineering Chemistry, S.K. Kataria and Sons publication, 1<sup>st</sup> Edition 2013.
- Jaspal D., Malviya A., Engineering Chemistry Practical Book, Alpha science International Ltd., 1<sup>st</sup> Edition, 2015.
- Thakur A., Practical Engineering Chemistry, Narosa Publication, 1<sup>st</sup> Edition, 2018.

| Year (Semester)   | Course Title             | Course Code                | L-T-P-Credits   |
|---|--------------------------|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Computer Programming Lab | ITL101                     | 0-0-2-1         |
| <b>Evaluation Policy</b>  | <b>Mid-Term</b>          | <b>Internal Assessment</b> | <b>End-Term</b> |
| 100 Marks   |                          |                            |                 |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes   | Bloom's Taxonomy Level |
|------------|---|------------------------|
| <b>CO1</b> | Apply programming for problem-solving and use various basic components of C program.                                    | 3                      |
| <b>CO2</b> | Evaluate the use of functions and different decision, and loop control structures.                                      | 5                      |
| <b>CO3</b> | Examine the use of cases in arrays and strings.   | 4                      |
| <b>CO4</b> | Evaluate various data structures like structures and unions; and implement dynamic memory allocation and file handling. | 5                      |

**Lab Details:**

### 1. Introduction

- Understanding compilation flow using gcc.
- Programs to understand how integers, characters, and strings are stored and represented in C.
- Programs to understand the ASCII character encoding.

### 2. Operators and expressions

- Programs to understand how to use different operators available in C.
- Programs to understand differences between logical and arithmetic operators.
- Programs to understand differences between logical and bitwise operators.
- Programs to evaluate algebraic expressions in C.

### 3. Number System

- Programs to obtain a full understanding of signed, unsigned, long and short numbers in C.
- Programs to understand exactly how numbers are represented in computers (octal, hexadecimal and binary numbers systems) .

### 4. Input and output Functions

- Programs to understand taking input from user using different input functions.
- Programs to understand printing of various data types using different output functions.
- Programs to exercise all flags in printf() and scanf() functions.
- Programs to understand printing of display patterns of numbers and asterisks.

### 5. Decision Control Structures

- Programs to understand the use of conditional statements like if-else.
- Programs to understand the use of nested control structures.
- Programs for implementing the Switch statements and its use cases.

### 6. Loop Control Structures

- Implementation of loops using C programs.

- b. Programs for solving some mathematical problems using loops.
- c. Programs for designing the patterns using loops.

#### **7. Functions**

- a. Programs to understand modularize of code using functions.
- b. Programs to implement function with/without arguments and with/without return types.
- c. Programs to understand static data types and static functions.

#### **8. Recursion**

- a. Programs to understand direct and indirect recursions using functions.
- b. Programs to generate mathematical series using recursion.

#### **9. Arrays and strings**

- a. Programs to understand how arrays work in C, how to use them, and how they are stored in memory.
- b. Programs to understand searching in an array.
- c. Programs to understand sorting techniques using arrays.

#### **10. Pointers**

- a. Programs to understand pointers in C.
- b. Programs to understand the relationship between array indexing and pointer arithmetic.
- c. Programs to use pointer to pass the address of data.

#### **11. Pointer usage in arrays**

- a. Programs to understand the relation between the name of the array and pointers.
- b. Programs to analyze the effect of arithmetic operations on the name of the array.

#### **12. Structures and Unions**

- a. Programs to understand creating, accessing and using structures.
- b. Programs to understand use of arrays of structures.
- c. Programs to understand pointers to structures and pointers as structures members.
- d. Programs to understand creating, accessing and using unions.

#### **13. Dynamic memory allocation**

- a. Programs to understand dynamic memory allocation especially with respect to 1D and 2D arrays.
- b. Programs to analyze the effect of dynamic memory allocation on memory management.

#### **14. File Handling**

- a. Programs to understand creating, reading, writing a file.
- b. Programs to understand taking input through arguments to the main() function.



| Year (Semester)   | Course Title                                  | Course Code                | L-T-P-Credits   |
|---|---|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> & 2 <sup>nd</sup> Semester) | <b>Fundamental Knowledge of Accreditation</b> | NBA101                     | 2-0-0-0         |
| <b>Evaluation Policy</b>  | <b>Mid-Term</b>                               | <b>Internal Assessment</b> | <b>End-Term</b> |
|   | 26 Marks                                      | 24 Marks                   | 50 Marks        |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes  | Bloom's Taxonomy Level |
|------------|--|------------------------|
| <b>CO1</b> | Analyse the need of the outcome-based course and Accreditation.  | 4                      |
| <b>CO2</b> | Interpret the graduate attribute, program outcomes and Bloom Taxonomy levels.                                | 5                      |
| <b>CO3</b> | Develop appropriate test items for all outcome based objectives for both summative and formative evaluation. | 3                      |
| <b>CO4</b> | lan an outcome-based curriculum document to meet NBA and Washington Accord requirements.                     | 3                      |

**Detailed Syllabus:**

| Module No.      | Contents   | Hours    |
|-----------------|--|----------|
| <b>Module 1</b> | Introduction to Outcome based Learning (OBL) & Outcome based Education (OBE) and its importance. Vision and Mission statements of the institute, Vision and Mission of the department,   | <b>6</b> |
| <b>Module 2</b> | Program educational objectives (PEOs), Program outcomes(POs), Program specific outcomes(PSOs), Graduate attributes and introduction of accreditation.(Washington Accord, NBA etc.).  | <b>6</b> |
| <b>Module 3</b> | Course Outcomes (COs), Bloom Taxonomy, Taxonomies levels, and Instructional Objectives. Assessment and Evaluation as per OBE, ICT for Assessment and Evaluation, Outcome-based Curriculum Design framework, Outcome-based Curriculum Design. | <b>8</b> |
| <b>Module 4</b> | Mapping of outcome-based curriculum with Program outcomes (POs), Program specific outcomes (PSOs), Outcome-based, learning style and learning approaches and life long learning.   | <b>6</b> |
| <b>Module 5</b> | CO attainments, PO/PSO attainments. Benefits of accreditation to the students and the Institute.   | <b>4</b> |

**Books Recommended:**

1. NBA user manuals.
2. <https://www.nbaind.org/Downloads/Documents>  
[https://onlinecourses.nptel.ac.in/noc23\\_ge46/preview](https://onlinecourses.nptel.ac.in/noc23_ge46/preview)

| Year (Semester)   | Course Title                       | Course Code                | L-T-P-Credits   |
|---|------------------------------------|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> & 2 <sup>nd</sup> Semester) | Elements of Mechanical Engineering | MET101                     | 2-1-0-3         |
| <b>Evaluation Policy</b>  | <b>Mid-Term</b>                    | <b>Internal Assessment</b> | <b>End-Term</b> |
|   | 26 Marks                           | 24 Marks                   | 50 Marks        |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes  | Bloom's Taxonomy Level |
|------------|--|------------------------|
| <b>CO1</b> | Examine materials and manufacturing processes for industrial applications. | 4                      |
| <b>CO2</b> | Evaluate the performance of energy conversion and conservation systems.    | 5                      |
| <b>CO3</b> | Apply the concepts of fluid engineering in practical and diverse fields.   | 3                      |
| <b>CO4</b> | Select the proper train drive for particular applications.                 | 3                      |

**Detailed Syllabus:**

| Module No.      | Contents  | Hours     |
|-----------------|---|-----------|
| <b>Module 1</b> | Units and measurements. Engineering Materials and Materials Response. Basics of manufacturing processes. Recent advances in mechanical engineering, Role of Computer-Aided Design, Simulation and 3D printing.  | <b>10</b> |
| <b>Module 2</b> | System and Surroundings, Thermodynamic processes, First and Second law of thermodynamics, Concept of Entropy. Engine Cycles and Efficiency. Basic idea of internal combustion engines. Heat transfer through conduction, convection and radiation. Heat exchangers. Energy conservation and conversion. | <b>12</b> |
| <b>Module 3</b> | General properties of fluids, Fluid statics, Pressure measurement. Equation of fluid motion, Bernoulli's Equation. Viscous Effects: Viscosity, Laminar and Turbulent Flows. Introduction to hydraulic machines: turbines, pumps, their types and applications in energy conversion.                     | <b>12</b> |
| <b>Module 4</b> | Gears, Types, Design Criteria, Speed, torque and power in gear sets. Simple, compound and reverted gear trains, gear ratios, applications.  | <b>8</b>  |

**Books Recommended:**

1. P.N. Rao. (2013). *Manufacturing technology: metal cutting and machine tools* (Vol. 2). Tata McGraw-Hill Education.
2. H S Shan(2017). *Manufacturing processes*, 2nd Edition. Tata McGraw-Hill Education.
3. [P. K. Nag](#), [K. Tripathi](#), [C. B. Pawara](#). *Basic Mechanical Engineering*.
4. Rattan, S. S. (2014). *Theory of machines*. Tata McGraw-Hill Education.

**Reference Books:**

1. Cengel, Yunus, John Cimbala, and Robert Turner. *Fundamentals of Thermal-Fluid Sciences (SI units)*. McGraw Hill, 2012.
2. Shigley, Joseph. *Theory of Machine and Mechanisms*, McGraw Hill 2014.

|  |                     |                     |                     |
|--|---------------------|---------------------|---------------------|
| Year (Semester)  | Course Title        | Course Code         | L - T - P = Credits |
| 1 <sup>st</sup> Year (I <sup>st</sup> & II <sup>nd</sup> Semester) | Engineering Physics | PHT-101             | 3 - 0 - 1 = 4       |
| Evaluation Policy  | Mid-Term            | Internal Assessment | End-Term            |
| NEP  | 26 Marks            | 24 Marks            | 50 Marks            |

**Pre-requisites:** None

### Course objectives of B.Tech. Eng Physics

- The main objective of the course is show that Newtonian Mechanics cannot accurately describe the physical behavior of our universe  
Two regimes, where Newtonian mechanics fails to accurately predict the physical outcomes are
  - When the size of system is small
  - When the bodies are moving with velocity comparable to velocity of light
 In this course we will see that in order to describe these two regimes accurately we need to use the ideas of Quantum mechanics and Special Theory of relativity besides materials at small scale and in low dimensions
  - Basic ideas of electromagnetism, their applications in modern science and Technology and in day-to-day life

### Course Outcomes

| CO No. | Course Outcomes   | Bloom's Taxonomy Level |
|--------|---|------------------------|
| C01    | Apply the laws of Electromagnetic waves in different engineering fields.                                  | 3                      |
| C02    | Analyze the concept of relativity to explore various natural phenomena.                                   | 4                      |
| C03    | Evaluate the concepts of quantum mechanics to understand the underlying mechanism of engineering problems | 5                      |
| C04    | Determine the significance new engineering materials and radioactive.                                     | 5                      |

### Detailed Syllabus:

| Module No. | Contents   | Hours |
|------------|--|-------|
| Module 1   | <b>Introduction to Electromagnetism:</b><br><b>Lecture 1:</b> Concept of Electromagnetism,<br><b>Lecture 2-3:</b> Basic equations of electricity and magnetism,<br><b>Lecture 4:</b> Displacement Current, Examples,<br><b>Lecture 5:</b> Nabla operator and its Operations<br><b>Lecture 6:</b> Maxwell equations in different media and its solution in one dimension,<br><b>Lecture 7:</b> Characteristic of Electromagnetic waves and spectrum,<br><b>Lecture 8:</b> Electrostatic Energy density and Magnetostatic Energy density, Poynting<br><b>Lecture 9:</b> Theorem and Conservation of momentum of Electromagnetic wave,<br><b>Lecture 10:</b> Reflection of EM waves, Polarization of EM waves<br><b>Lecture 11:</b> Examples, Numerical problems and practical demonstrations | 11    |
| Module 2   | <b>Special Theory of Relativity:</b><br><b>Lecture 1:</b> Inertial and Non inertial Frames of Reference, Galilean Transformations,<br><b>Lecture 2:</b> Michelson Morley Experiment,<br><b>Lecture 3:</b> Postulates of Special Theory of Relativity<br><b>Lecture 4:</b> Lorentz Transformations,<br><b>Lecture 5-6:</b> Time Dilation, Doppler Effect in light and its application in Expanding of Universe,<br><b>Lecture 7:</b> Twin Paradox, Length Contraction, Simultaneity   | 10    |

|                 |   |           |
|-----------------|---|-----------|
|                 | <p><b>Lecture 8:</b> Velocity addition rule<br/> <b>Lecture 9:</b> Relativistic Mass, Energy and Momentum,<br/> <b>Lecture 10:</b> Equivalence of Mass and Energy, Examples, Numerical problems</p>   |           |
| <b>Module 3</b> | <p><b>Quantum Mechanics:</b><br/> <b>Lecture 1:</b> Transition from Classical to Quantum mechanics: Black Body Radiation,<br/> <b>Lecture 2:</b> Photoelectric effect, Compton effect.<br/> <b>Lecture 3:</b> De-Broglie Waves, Concept of wave packets, Numerical problems and practical demonstrations<br/> <b>Lecture 4:</b> Heisenberg Uncertainty principle and its applications,<br/> <b>Lecture 5:</b> Linearity and Superposition of the wave function,<br/> <b>Lecture 6:</b> Operators, Expectation values,<br/> <b>Lecture 7:</b> Schrodinger's Equations: Time-dependent and Steady State Form,<br/> <b>Lecture 8:</b> Quantum Confinement Concept,<br/> <b>Lecture 9:</b> 1-D Particle in a box: Finite and Infinite Potential Well.<br/> <b>Lecture 10:</b> Quantum mechanical tunneling,<br/> <b>Lecture 11:</b> Harmonic Oscillator, Numerical problems</p> | <b>11</b> |
| <b>Module 4</b> | <p><b>Fundamental Engineering Materials:</b><br/> <b>Lecture 1-2:</b> Introduction and Classification of Materials,<br/> <b>Lecture 3:</b> Composites Fiber, Metallic, Glasses, ceramics, and semiconductors.<br/> <b>Lecture 4:</b> Biomaterials, Magnetic materials, Properties &amp; Applications,<br/> <b>Lecture 5-6:</b> Superconducting materials: Meissner effect –Type I &amp; Type II Superconductors<br/> <b>Lecture 7: Nuclear Materials,</b> Binding Energy, Liquid-Drop Model,<br/> <b>Lecture 8:</b> Nuclear Fission and Fusion, Radioactive Decay<br/> <b>Lecture 9-10:</b> Half Life, Alpha Decay (Qualitative analysis), Beta Decay (Fermi Theory) and Gamma Decay and Numerical Problems.</p>  | <b>10</b> |

### Books Recommended:

1. Griffith D. J., (1999) *Introduction to Electrodynamics*, USA: Prentice-Hall.
2. Resnick R. (2007) *Introduction to Special Relativity*, Singapore: John Wiley & Sons
3. Beiser A., Mahajan S., Choudhury S. R. (2009) *Concepts of Modern Physics, (6<sup>th</sup> Edition)*, India: McGraw Hill Education
4. Callister's (2009), *Materials Science and Engineering (2<sup>nd</sup> edition)*, Wiley

Note: e books are available on our web page.

| Year (Semester)   | Course Title          | Course Code                | L-T-P-Credits   |
|---|-----------------------|----------------------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Environmental Studies | CHT-102                    | 2-1-0-3         |
| <b>Evaluation Policy</b>  | <b>Mid-Term</b>       | <b>Internal Assessment</b> | <b>End-Term</b> |
|   | 26 Marks              | 24 Marks                   | 50 Marks        |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes  | Bloom's Taxonomy Level |
|------------|--|------------------------|
| <b>CO1</b> | Assess the role of environment and natural resources towards sustainability.         | 4                      |
| <b>CO2</b> | Identify an eco-system with the help of biogeochemical cycles.                       | 3                      |
| <b>CO3</b> | Classify the environmental pollutions and their control measures.                    | 4                      |
| <b>CO4</b> | Discuss the different social aspects related to the environment by field assignment. | 6                      |

**Detailed Syllabus:**

| Module No.      | Contents   | Hours     |
|-----------------|--|-----------|
| <b>Module 1</b> | <b>Environment and Natural Resources</b><br>Introduction, scope and importance of environmental studies, Types of natural resources, Natural resources and associated problems (1) Forest resources: deforestation, dams and their effects on forests and tribal people, (2) Water resources: surface and ground water, floods, drought, conflicts over water, benefits and problems associated with dams, (3) Mineral resources: classification and environmental effects of extracting the mineral resources, (4) Food resources: world food problems, effects of modern agriculture, problems with the use of fertilizers-pesticides and (5) Energy resources: growing energy needs, renewable and non-renewable energy sources and their applications. | <b>11</b> |
| <b>Module 2</b> | <b>Ecology and Eco-Systems</b><br>Introduction, basic concept and definitions, ecology, ecosystems, structure and function of an eco-system, Energy flow in the ecosystems (food chain, food web, ecological pyramids), Biogeochemical cycles (water cycle, nitrogen cycle, carbon cycle, oxygen cycle, phosphorous cycle, sulphur cycle), Ecological succession, Introduction, types, characteristic features, structure and function of forest and freshwater ecosystems (lake/river).   | <b>10</b> |
| <b>Module 3</b> | <b>Environmental Pollution</b><br>Definition of pollution; pollutants; classification of pollutants; solubility of pollutants (hydrophilic and lipophilic pollutants), Definition, Causes, Effects and Control measures of (1) Air pollution (global warming, acid rain, ozone layer depletion) (2) Water pollution (COD, BOD, DO) (3) Soil pollution (4) Marine pollution and (5) Nuclear hazards.<br>Solid waste Management: Causes, effects and control measures of urban and industrial wastes.  | <b>11</b> |
| <b>Module 4</b> | <b>Social issues and the Environment, Field Assignment</b><br>From unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, watershed management, Environmental ethics: issues and possible solutions,   | <b>10</b> |

|  |   |  |
|--|---|--|
|  | climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Environment protection Act, Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act, Wildlife protection Act, Forest conservation Act.<br>Field Assignment: Assignment on local environment problems. |  |
|--|---|--|

**Books Recommended:**

1. Bharucha E., Textbook of Environmental Studies for Undergraduate Courses, Universities Press, 2<sup>nd</sup> edition, 2019.
2. Mishra D.D., Fundamental Concepts in Environmental Studies, S. Chand & Company Pvt. Ltd, 4<sup>th</sup> edition, 2014.
3. Rajgopalan R., Environmental Studies: From Crisis to Cure, Oxford University Press, 3<sup>rd</sup> edition, 2015.
4. Kaushik A., Kaushik C. P., Perspectives in Environmental Studies, New Age International Pvt. Ltd., 7<sup>th</sup> edition, 2021.
5. Joseph B., Environmental Studies, McGraw Hill Education, 3<sup>rd</sup> edition, 2017.
6. Chiras D.D., Environmental Science, Jones and Bartlett Publishers, 10<sup>th</sup> edition, 2014.
7. Nazaroff W.W., Alvarez-Cohen L., Environmental Engineering Science, Wiley India Pvt. Ltd., 1<sup>st</sup> edition, 2009.
8. Gregory K.J., Environmental Sciences: A Student's Companion, SLE Pound Publication, 1<sup>st</sup> edition, 2008.



| Year (Semester)   | Course Title          | Course Code         | L-T-P-Credits |
|---|-----------------------|---------------------|---------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Engineering Mechanics | CVT-102             | 2-1-0-3       |
| Evaluation Policy   | Mid-Term              | Internal Assessment | End-Term      |
|   | 26 Marks              | 24 Marks            | 50 Marks      |

**Course Objective:**

Develop an understanding of the fundamental concepts, theories, and principles of Engineering Mechanics for their applications in Solving Engineering Problems.

**Course Outcomes:**

| CO No. | Course Outcomes  | Bloom's Taxonomy Level |
|--------|--|------------------------|
| CO1    | Utilize the fundamentals of Static Equilibrium and Stress-Strain Concepts to Solve Engineering Problems. | 3                      |
| CO2    | Analyze the Properties of Plane Surfaces and the Concept of Friction in Mechanical Problems.             | 4                      |
| CO3    | Determination of Forces in Plane Trusses and Explain the Principle of Virtual Displacement.              | 5                      |
| CO4    | Apply the Concept of Dynamics of Rigid Bodies and Energy Principles to Solve Engineering Problems.       | 3                      |

| Unit | Contents  | Contact Hours |
|------|---|---------------|
| 01.  | <b>Introduction to Engineering Mechanics-</b><br>Statics: Fundamental concepts and laws of mechanics. Equilibrium of bodies: Free-body diagrams, Statical determinacy. Force systems: Principle of Moments, Resultant of forces, Couple systems, Equilibrium of Rigid Bodies, Support reactions. Torque due to a force.<br><b>Concept of Stress and Strain:</b> Compatibility and Stress-Strain Relations. Stress-Strain diagrams, Hooke's law, Modulus of elasticity (E), Lateral strains, Poisson's ratio, Multi-axial stress system, Volumetric strain, Bulk modulus (K), Shear stress concept, Modulus of rigidity (G). Relation between E, G, and K. | 18            |
| 02.  | <b>Properties of plane surfaces:</b> Centroid and Center of Gravity, First moment of area, Second Moment of Area.<br><b>Friction:</b> General concept of Friction. Static and Dynamic Friction.   | 10            |
| 03.  | <b>Plane Trusses:</b> Forces in members of a Truss by Method of Joints and Method of Sections.<br><b>Virtual Work:</b> Principle of Virtual Work, Calculation of Virtual Displacement and Virtual Work.   | 10            |
| 04.  | <b>Dynamics of Rigid Bodies:</b> Newton's Laws, D'Alembert's Principle, Energy Principles.  | 4             |

**Textbook:**

1. Hibbeler, R.C., "Mechanics of Materials", 6th SI edition, Prentice Hall.
2. Hibbeler, R.C., Engineering Mechanics: Statics and Dynamics, Prentice Hall(2012).
3. Singer, F. L., Engineering Mechanics Statics & Dynamics, Prentice Hall.

**References:**

1. Beer, P.F. and Johnston (Jr.) E.R. "Mechanics of Materials", S.I. Version, Tata McGraw Hill, India, 2001.
2. Beer, Johnston, Clausen and Staab, Vector Mechanics for Engineers, Dynamics, McGraw-Hill Higher Education (2003)
3. Timoshenko and Young, Engineering Mechanics, Tata McGraw Hill Education Private Limited (2000).
4. Shames, I.H. Engineering Mechanics: Dynamics, Pearson Education India (2002).
5. Popov, E.P., Engineering Mechanics of Solids, Prentice-Hall, 1999.
6. Gere J. M. and Good no, B. J., Strength of Materials, Cengage Learning.
7. Craig, R.R., "Mechanics of Materials", 2nd edition, John Wiley and Sons



| Year (Semester)   | Course Title         | Course Code           | L-T-P-Credits |
|---|----------------------|-----------------------|---------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | English Language Lab | HSL101                | 0-0-2-1       |
| Evaluation Policy   | Mid-Term             | Continuous Assessment | End-Term      |
|   |                      | 60 Marks              | 40 Marks      |

**Pre-requisites:** None.

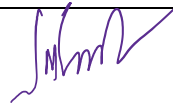
**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes   | Bloom's Taxonomy Level |
|------------|---|------------------------|
| <b>CO1</b> | Develop considerable vocabulary enhancement and correct usage of English grammar. | 3                      |
| <b>CO2</b> | Perceive effective listening and speaking skills.                                 | 5                      |
| <b>CO3</b> | Importance of reading and writing skills.   | 5                      |
| <b>CO4</b> | Adapt themselves for various professional settings verbally and non-verbally.     | 6                      |

#### Detailed Syllabus:

| Module/Week No. | Contents  | Hours |
|-----------------|---|-------|
| <b>Week 1</b>   | <b>Vocabulary-I</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: English with Ronnie (cuq.in/GXUO)       | 2     |
| <b>Week 2</b>   | <b>Listening I</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: Listening Time (cuq.in/IDkX)             | 2     |
| <b>Week 3</b>   | <b>Speaking I</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: English Speaking Success (cuq.in/P1bN)    | 2     |
| <b>Week 4</b>   | <b>Reading I</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: Oxford Online English (cuq.in/adxO)        | 2     |
| <b>Week 5</b>   | <b>Writing I</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: Purdue OWL (owl.purdue.edu/)               | 2     |
| <b>Week 6</b>   | <b>Grammar I</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: English with James (cuq.in/UruK)           | 2     |
| <b>Week 7</b>   | <b>Interpersonal Skills I</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: LetThemTalkTV (cuq.in/6gvC)   | 2     |
| <b>Week 8</b>   | <b>Vocabulary II</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: English with Katherine (cuq.in/wJEO)   | 2     |
| <b>Week 9</b>   | <b>Listening II</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: Aleena Rais Live (cuq.in/4Q72)          | 2     |
| <b>Week 10</b>  | <b>Speaking II</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: Speak English with Vanessa (cuq.in/9Rrz) | 2     |
| <b>Week 11</b>  | <b>Reading II</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: Learn English with Cambridge              | 2     |

|                |   |   |
|----------------|---|---|
|                | (surl.li/ivyjd)   |   |
| <b>Week 12</b> | <b>Writing II</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: The Writing Center: University of North Carolina at Chapel Hill(writingcenter.unc.edu/) | 2 |
| <b>Week 13</b> | <b>Grammar II</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: English with Jennifer (cuq.in/uncc)   | 2 |
| <b>Week 14</b> | <b>Interpersonal Skills II</b><br>Selected Laboratory Modules (with Practice Exercises)<br>Complementary Material: Advanced English—For Professionals (cuq.in/7wJ7)                           | 2 |



| Year (Semester)   | Course Title                             | Course Code | L-T-P-Credits   |
|---|--|-------------|-----------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Engineering & Applied Physics Laboratory | PHL-101     | 0-0 -2-1        |
| <b>Evaluation Policy</b>  | <b>Continuous Assessment</b>             |             | <b>End-Term</b> |
|   | 60 Marks                                 |             | 40 Marks        |

**Pre-requisites:** None

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes   | Bloom's Taxonomy Level |
|------------|---|------------------------|
| <b>CO1</b> | Examine the interaction of radiation with matter.   | 4                      |
| <b>CO2</b> | Analyze the physical implications of Simple harmonic motion under the influence of gravity. | 4                      |
| <b>CO3</b> | Evaluate the dynamics of electromagnetic fields.  | 5                      |
| <b>CO4</b> | Design the semiconductor based devices  | 6                      |

**Detailed Syllabus:**

| Module No.      | Contents  | Hours     |
|-----------------|---|-----------|
| <b>Module 1</b> | <ol style="list-style-type: none"> <li>To determine Planck's constant and work function using photoelectric effect.</li> <li>To verify inverse square law of radiation using photoelectric effect.</li> <li>Determination of absorption coefficient of a liquid or solution with the help of Photovoltaic cell.</li> </ol>  | <b>06</b> |
| <b>Module 2</b> | <ol style="list-style-type: none"> <li>To determine value of acceleration due to gravity with Bar pendulum.</li> <li>To determine value of acceleration due to gravity with Kater's pendulum.</li> <li>To determine the young's modulus of the material of a given beam supported on two knife edges and loaded at the middle point.</li> <li>To verify Stoke's law and determine the coefficient of viscosity of a highly viscous liquid.</li> </ol> | <b>08</b> |
| <b>Module 3</b> | <ol style="list-style-type: none"> <li>To determine the wavelength of sodium light by newton's rings method.</li> <li>To find angle of prism, angle of minimum deviation and refractive index of prism.</li> <li>To study variation of magnetic field along the axis of circular coil carrying current.</li> </ol>  | <b>08</b> |
| <b>Module 4</b> | <ol style="list-style-type: none"> <li>To determine the Hall coefficient for given semiconductor and study its field dependence.</li> <li>To plot the V-I Characteristics of the solar cell and hence determine the fill factor.</li> <li>To plot the V-I Characteristics of the P-N Junction Diode.</li> <li>To study the temperature dependence of resistivity of semiconductor and to determine band gap of experimental material (Ge).</li> </ol> | <b>06</b> |

**Books Recommended:**

- Arora C. L. (2016) *Practical Physics*, India: S Chand.
- Gupta S. L., Kumar V. (2010) *Practical Physics* India: PragatiPrakashan.
- Das R., Robinson C. S., Kumar R. and Sahu P. R. (2016) *A Textbook of Engineering Physics Practical*, India: University Science Press.

|   |                       |             |               |
|---|-----------------------|-------------|---------------|
| Year (Semester)   | Course Title          | Course Code | L-T-P-Credits |
| 1 <sup>st</sup> Year (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) | Workshop Practice     | WSL101      | 0-0 -4-2      |
| Evaluation Policy   | Continuous Assessment |             | End-Term      |
|   | 60 Marks              |             | 40 Marks      |

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No. | Course Outcomes  | Bloom's Taxonomy Level |
|--------|--|------------------------|
| C01    | Identify and apply relevant tools and techniques in various Machining Operations.                        | 3                      |
| C02    | Explain various joints, tools, operations and techniques in Welding and Sheet-Metal Shop.                | 5                      |
| C03    | Apply basic principles and techniques of Forging and Foundry Shop.                                       | 3                      |
| C04    | Take part in basic operations using different types of tools and fixtures in Carpentry and Fitting Shop. | 4                      |

## **SYLLABUS**

### **Machining Trade**

**(Machinist Trade & Turning Section)**

**(8 Hrs.)**

#### **Theoretical Instructions:**

Safety Precautions, Introduction of machine tools such as lathe, drilling machine & other related metal cutting tools. Parts of lathe & basic metal cutting operations. Introduction of various types of cutting tools and their material.

#### **Practical Demonstrations:**

Demonstration on Lathe & basic operations such as drilling, facing, turning, taper turning, step turning, knurling, chamfering etc. Demonstration of basic measuring instruments.

**Job No. 1: TO PERFORM PLAIN AND STEP TURNING ON A JOB ON CENTRE LATHE AS PER GIVEN DRAWING.**

**Job No. 2: TO PERFORM TAPER TURNING AND KNURLING ON JOB NO. 1 AS PER THE DRAWING.**

**Job No. 3: TO PERFORM GROOVING OPERATION ON JOB NO. 2 AS PER THE DRAWING.**

### **Sheet Metal & Spray-Painting Section**

**(8 Hrs.)**

#### **Theoretical Instructions:**

Safety precautions, brief introduction of sheet metal, various tools, joints & operations. Soldering, brazing, & shearing, Fluxes & their applications. Introduction of different machines and pattern development in detail. Brief description of paints & varnishes.

#### **Practical Demonstrations:**

Demonstration of all basic hand tools & equipment's. Fabrication of simple joints and jobs. Preparation & painting of surfaces for varnish & painting etc.

**Job No. 1: TO DEVELOP A CYLINDRICAL JOB.**

**Job No. 2: TO DEVELOP A SQUARE ELBOW AS PER THE DRAWING.**

**Job No. 3: TO DEVELOP A RECTANGULAR TRAY AS PER DRAWING.**

### **Fitting & Benchwork Section**

**(8 Hrs.)**

#### **Theoretical Instructions:**

Safety precautions, introduction to fitting & bench work. Demonstration of basic hand tools, holding devices and basic fitting operations such as measuring, marking, filing, sawing, drilling, tapping, buffing.

#### **Practical Demonstrations:**

Demonstration of all basic hand tools/ measuring tools & equipment's. Demonstration of simple operations such as marking, punching, filing, sawing, scrapping, drilling.

**Job No. 1: TO FABRICATE A SQUARE PLATE OF MILD STEEL WORK PIECE 50X50X 5 mm.**

**Job No. 2: TO FABRICATE A SNAP FITTING OF MILD STEEL WORK PIECE 50 X 50 X 5 mm.**

**Job No. 1: TO FABRICATE A CROSS/SQUARE FITTING OF MILD STEEL WORK PIECE 50X50X 5 mm.**

### **Welding Section**

**(8 Hrs.)**

#### **Theoretical Instructions:**

Safety Precautions, Introduction of welding processes like electric arc welding, Gas Welding, MIG Welding, TIG welding, Submerged arc welding & spot welding. Various Fluxes & electrodes used in welding. Introduction of ac & dc welding and its applications.

#### **Practical Demonstrations:**

Demonstration of all basic tools & personal protective equipment's. Demonstration of different types of joints by using arc welding & gas welding etc.

**Job No.1: TO PERFORM A ROUGH WELDING USING SHIELDED METAL ARC WELDING MACHINE (SMAW)**

**Job No.2: TO MAKE A SINGLE-V BUTT JOINT OF MILD STEEL 80x50x8mm**

**Job No.3: TO MAKE A LAP JOINT OF MILD STEEL 85x35x6mm**

### **Foundry and Casting Section**

**(8 Hrs.)**

#### **Theoretical Instructions:**

Safety Precautions, Introduction to foundry and casting processes, basic steps in casting processes types of patterns, brief description of common hand tools used in foundry work,

Introduction of risers, runners, gates moulding sand and its composition and its properties. Name of the common Metals for Casting.

#### **Practical Demonstrations:**

Demonstration and practice for preparation of moulding sand, use of hand tools to prepare the mould by using different types of patterns

**Job No. 1: TO PREPARE A GREEN SAND MOULD BY USING STEP PULLEY BLOCK FOR CASTING**

**Job No. 2: TO PREPARE A GREEN SAND MOULD BY USING OPEN BEARING BLOCK FOR CASTING**

**Job No. 3: TO PREPARE A GREEN SAND MOULD BY USING SELF CORED PATTERN FOR CASTING**

### **Smithy & Forging Section**

**(8 Hrs.)**



**Theoretical Instructions:**

Safety precautions, introduction of forging tools. Materials & their heat treatments. Description of all forging operations such as hand forging, upsetting, drawing & punching. Introduction of various forging methods. Comparison of hot & coldworking.

**Practical Demonstrations:**

Demonstration & practice of different smithy operations like forging, cutting, punching, bending etc. Demonstration & practice of MS rod into forged MS ring & octagonal cross section.

**Job No. 1: TO FORGE MS-SQUARE FROM MS-ROUND BAR BY USING DIFFERENT FORGING HAND TOOLS.**

**Job No. 2: TO FORGE A SQUARE HEADED BOLT FROM MS-ROUND (60x30mm).**

**Job NO. 3: TO FORGE AN MS-OCTAGON FROM A SQUARE MS-BAR (80X80 mm).**

**Carpentry & Pattern Making Section****(8 Hrs)****Theoretical Instructions:**

Safety Precautions, Introduction of carpentry & joinery, different tools used in carpentry. Seasoning of wood and defects of wood. Various types of joints. Brief description of wood working machines and patternmaking.

**Practical Demonstrations:**

Demonstration & practice of different carpentry operation like Planning, sawing & chiselling and joints. Demonstration of pattern making tools & materials.

**Job No. 1: PLANNING, SAWING AND CHISELING OF A WOODEN PLANK AS PER DRAWING.**

**Job No. 2: TO PREPARE HALF LAP CROSS JOINT OF SPECIFIED DIMENSIONS.**

**Job No. 2: TO PREPARE A BRIDLE JOINT OF SPECIFIED DIMENSIONS.**

**List of recommended books: -**

- 1) Workshop Technology by W. A. J. Chapman
- 2) Workshop Technology by Choudhury H S K
- 3) Workshop Practice by Swarn Singh
- 4) Workshop Technology by Virender narula



| Year (Semester)                                 | Course Title                              | Course Code         | L-T-P-Credits |
|---|---|---------------------|---------------|
| 1 <sup>st</sup> Year (2 <sup>nd</sup> Semester) | Advanced English and Communication Skills | HST1012             | 2-1-0-3       |
| Evaluation Policy                               | Mid-Term                                  | Internal Assessment | End-Term      |
|   | 26 Marks                                  | 24 Marks            | 50 Marks      |

**Pre-requisites:** None.

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes   | Bloom's Taxonomy Level |
|------------|---|------------------------|
| <b>CO1</b> | Apply the vocabulary and grammatical elements correctly in English communication.                       | 3                      |
| <b>CO2</b> | Analyze the selected texts using the critical reading strategies effectively.                           | 4                      |
| <b>CO3</b> | Develop persuasive technical writing for academic and professional purposes.                            | 6                      |
| <b>CO4</b> | Adapt impressive verbal and non-verbal interpersonal communication required for work place environment. | 6                      |

**Detailed Syllabus:**

| Module No.      | Contents  | Hours      |
|-----------------|---|------------|
| <b>Module 1</b> | <b>Vocabulary and Grammar</b><br>Abbreviations and Acronyms [Textbook Pages 88-89]<br>Words from Foreign Languages and Technical Fields [Textbook Pages 108-112 and 130-133]<br>Noun-Pronoun Agreement, Subject-Verb Agreement [Textbook Pages 35-39 and 114-115]<br>Tenses, Misplaced Modifiers [Textbook Pages 62-71 and 113-115] | (10 Hours) |
| <b>Module 2</b> | <b>Critical Reading</b><br>Techniques of Effective Reading [Textbook Pages 15-16]<br>Intensive and Extensive Reading [Textbook Pages 96-97]<br>Practicing Reading Comprehension [Textbook Pages 52-57, 85-88, 106-108, and 116-119]<br>Reading Non-Prescribed Passages/Texts  | (11 Hours) |
| <b>Module 3</b> | <b>Technical Writing</b><br>Formal Letters [Textbook Pages 43-48] and Email Writing<br>Job Application and Résumé Writing [Textbook Pages 48-51]<br>Précis Writing [Textbook Pages 102-105]<br>Report Writing [Textbook Pages 120-126]  | (10 Hours) |
| <b>Module 4</b> | <b>Interpersonal Skills</b><br>Non-Verbal Communication<br>Listening and Its Types<br>Debate and Group Discussion<br>Job Interviews   | (11 Hours) |

**Books Recommended:**

1. N. P. Sudharshana and C. Savitha, *English for Engineers*, Cambridge, 2018.
2. [learnenglish.britishcouncil.org/business-english/english-emails](http://learnenglish.britishcouncil.org/business-english/english-emails)[For Unit3, Email Writing]
3. [www.skillsyouneed.com/](http://www.skillsyouneed.com/) [ForUnit4]

| Year (Semester)   | Course Title   | Course Code         | L-T-P-Credits |
|---|----------------|---------------------|---------------|
| 1 <sup>st</sup> Year (1 <sup>st</sup> & 2 <sup>nd</sup> Semester) | Mathematics-II | MAT-102             | 2-1-0-3       |
| Evaluation Policy   | Mid-Term       | Internal Assessment | End-Term      |
|   | 26 Marks       | 24 Marks            | 50 Marks      |

**Pre-requisites:** A student should have basic knowledge of integral calculus and ordinary differential equations .

**Course Outcomes:** At the end of the course, the student will be able to:

| CO No.     | Course Outcomes   | Bloom's Taxonomy Level |
|------------|---|------------------------|
| <b>CO1</b> | Determine the nature of series and Fourier Series of various functions.               | 5                      |
| <b>CO2</b> | Solve problems related to partial differential equations by various methods.          | 3                      |
| <b>CO3</b> | Apply partial differential equations for solution of wave equation and heat equation. | 3                      |
| <b>CO4</b> | Evaluate problems related to double and triple integrals, Beta and Gamma functions.   | 5                      |

#### Detailed Syllabus:

| Module No.      | Contents   | Hours     |
|-----------------|--|-----------|
| <b>Module 1</b> | Sequence and series, Fourier series, Dirichlet's condition for a Fourier series, Fourier series for functions having points of discontinuity, Fourier series for functions having arbitrary period, Half range series.   | <b>10</b> |
| <b>Module 2</b> | Formation of PDE, Lagrange's linear equations , Partial differential equations of first order, Standard forms, Partial differential equations of second and higher order, Homogeneous partial differential linear equations with constant coefficients, Non-homogeneous linear partial differential equations, Charpit's method. | <b>12</b> |
| <b>Module 3</b> | Classification of linear partial differential equation of second order, Vibration of a stretched flexible string, Heat flow equation, Wave equation, Solution by the methods of separation of variables.   | <b>8</b>  |
| <b>Module 4</b> | Beta & Gamma functions (definition & related problems), Differentiation under the integral sign ( Leibnitz rule). Jacobians, Double & Triple integrals, Change of Variables in double integrals.   | <b>12</b> |

#### Books Recommended:

1. Jain, R.K and Iyengar, S.R.K.(2008) *Advanced Engineering Mathematics*, Third Edition, Narosa Pub. House.
2. Kreyszig, E. (2006).*Advanced Engineering Mathematics*, 9<sup>th</sup> Edition, John Wiley Sons.
3. Piaggio, H.T.H. *Differential Equations*, CBS publishers.

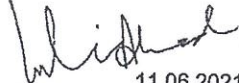
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|                    |   |          |   |          |      |  |        |       |               |        |      |   |         |
|--------------------|---|----------|---|----------|------|--|--------|-------|---------------|--------|------|---|---------|
|                    | through proper channel along with necessary documents for possible consideration.   |          |   |          |      |  |        |       |               |        |      |   |         |
| SUGC-2021/5        | UG Manual   |          |   |          |      |  |        |       |               |        |      |   |         |
| Resolution -5/2021 | <p>Approved. The members were informed that in response to senate resolution in addition to Dean (Academic) only one department had pointed some typo corrections and suggestions in the manual which were incorporated in it. It was decided to upload the manual on the institute website in its final form. Some modifications which need a mention here are:</p> <p>(a) Minimum CGPA for award of B.Tech. degree as 5.5 is withdrawn<br/> (b) No student can pass a theory/laboratory course without securing at least 40% of the maximum marks in end semester examination.<br/> (c) If a B.Tech. student does not register for consecutive two semesters, his/her admission should be suspended &amp; if he/she doesn't register consecutively for another two semesters, the admission should automatically be withdrawn from the institute.<br/> (d) The end semester project evaluation in 8<sup>th</sup> Semester will be done by following committee</p> <table border="0"> <tr> <td>(i)</td> <td>Head of the Department or his/her nominee</td> <td>Chairman</td> </tr> <tr> <td>(ii)</td> <td>External (outside the institute) or internal (from sister department) expert nominated by Chairman senate on the recommendation of HOD</td> <td>Member</td> </tr> <tr> <td>(iii)</td> <td>Convener DUGC</td> <td>Member</td> </tr> <tr> <td>(iv)</td> <td>Faculty members from the deptt. (minimum two, coordinator and supervisor)</td> <td>Members</td> </tr> </table> | (i)      | Head of the Department or his/her nominee | Chairman | (ii) | External (outside the institute) or internal (from sister department) expert nominated by Chairman senate on the recommendation of HOD | Member | (iii) | Convener DUGC | Member | (iv) | Faculty members from the deptt. (minimum two, coordinator and supervisor) | Members |
| (i)                | Head of the Department or his/her nominee   | Chairman |   |          |      |  |        |       |               |        |      |   |         |
| (ii)               | External (outside the institute) or internal (from sister department) expert nominated by Chairman senate on the recommendation of HOD  | Member   |   |          |      |  |        |       |               |        |      |   |         |
| (iii)              | Convener DUGC   | Member   |   |          |      |  |        |       |               |        |      |   |         |
| (iv)               | Faculty members from the deptt. (minimum two, coordinator and supervisor)   | Members  |   |          |      |  |        |       |               |        |      |   |         |

The meeting came to an end with a vote of thanks to the chair.

By Order

  
11.06.2021  
(Prof. Aijaz Ahmad)  
Chairman SUGC

Copy to: -

1. Dean Academic Affairs for information and to put before next senate meeting for ratification please.
2. All SUGC members for information please.
3. P.A. to Director for information of Director please
4. Concerned file.

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|                         |   |
|-------------------------|---|
|                         | <p>declaration of their results.</p> <p>Further, it was decided that the course credits shall be uniform in all the departments at Ph. D level. The course nomenclature will be as under. The name of the Department will be post-fixed with the course name viz Research Methodology e.g.</p> <p style="text-align: center;"><b>Research Methodology (Civil)</b></p> <p>Further all the Departments will give different codes to this course as per convenience.</p>                       |
| <b>Senate 28/09</b>     | To ratify the action taken by the Director in having approved the Minutes of 1 <sup>st</sup> , 2 <sup>nd</sup> & 3 <sup>rd</sup> SUGC meetings of 2021.   |
| <b>Resolution 09/28</b> | Ratified.   |
| <b>Senate 28/10</b>     | To consider the proposal of re-organization of M. Tech. Schemes (CED /MED) (Ref. SPGC 07/08, 10/08, 11/08 & 12/08).   |
| <b>Resolution 10/28</b> | Ratified.   |
| <b>Senate 28/11</b>     | To consider the allotment of supervisors to 03 Ph. D Scholars of superannuated faculty member namely Dr. G.R. Khan, Department of Physics (Ref: SPGC 35/08).  |
| <b>Resolution 11/28</b> | Ratified with the remarks that Head, Physics Department shall submit Doctoral Committee minutes through Chairman DPGC and completion of all other statutory formalities.  |
| <b>Senate 28/12</b>     | To consider the proposal regarding implementation of National Education Policy (NEP)-2020 at National Institute of Technology Srinagar.   |
| <b>Resolution 12/28</b> | Recommendations of the constituted committee shall be pursued by Prof. M. A. Ahanger for submission of his remarks/observations, if any. Subsequently, the recommendations will be circulated among all the Head of the Departments for feedback before implementation of NEP in the Institute. The Chairman of the committee will submit its revised recommendation after compilation of feedback from each department to Chairman, Senate for implementation of NEP-2020 at NIT Srinagar. |
| <b>Senate 28/13</b>     | To consider the recommendations of the minutes of meeting held on 8th April 2021 between Dean Academic Affairs, Associate Dean Academic Affairs and Associate Dean Examination.   |
| <b>Resolution 13/28</b> | <p>Decided as follows:</p> <p>i) <b>Duplicate Grade Cards: Approved.</b> The Grade Cards will be issued after applying on the requisite format provided by the Institute subject to production of an affidavit on a judicial stamp paper for loss/theft/misplace etc. of grade cards. The fee applicable for Duplicate Grade Cards will be Rs 300/- instead of Rs 100 per grade card subject to maximum of Rs 1500/-. 3</p>   |

**B.Tech Mechanical Engineering Course Scheme (3<sup>rd</sup> to 8<sup>th</sup> Semester)  
Effective From Admission Batch 2023**

**Semester - 3<sup>rd</sup>**

| S. No.       | Course Code | Course Title                         | Course Type | Credits   | Contact Hours Per Week |          |          | Total Contact Hours |
|--------------|-------------|--------------------------------------|-------------|-----------|------------------------|----------|----------|---------------------|
|              |             |                                      |             |           | L                      | T        | P        |                     |
| 1            | MET201      | Mechanics of Materials-I             | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 2            | MET202      | Fundamentals of Dynamics             | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 3            | MET203      | Manufacturing Processes-I            | Theory      | 3         | 3                      | 0        | 0        | 3                   |
| 4            | MET204      | Engineering Thermodynamics           | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 5            | MET205      | Fluid Mechanics-I                    | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 6            | HST059      | Society and Sensitivity              | Theory      | 3         | 3                      | 0        | 0        | 3                   |
| 7            | MEL211      | Manufacturing Processes-I Lab        | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| 8            | MEL212      | Fluid Mechanics Lab                  | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| 9            | MEL213      | Machine Drawing & Solid Modeling Lab | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| <b>Total</b> |             |                                      |             | <b>21</b> | <b>14</b>              | <b>4</b> | <b>6</b> | <b>24</b>           |

**Semester - 4<sup>th</sup>**

| S. No.       | Course Code | Course Title                   | Course Type | Credits   | Contact Hours Per Week |          |          | Total Contact Hours |
|--------------|-------------|--------------------------------|-------------|-----------|------------------------|----------|----------|---------------------|
|              |             |                                |             |           | L                      | T        | P        |                     |
| 1            | MET251      | Mechanics of Materials-II      | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 2            | MET252      | Theory of Machines-I           | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 3            | MET253      | Manufacturing Processes-II     | Theory      | 3         | 3                      | 0        | 0        | 3                   |
| 4            | MET254      | Heat Transfer                  | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 5            | MET255      | Applied Thermodynamics-I       | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 6            | MAT204      | Mathematics-III                | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 7            | MEL261      | Mechanics of Materials Lab     | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| 8            | MEL262      | Theory of Machines-I Lab       | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| 9            | MEL263      | Manufacturing Processes-II Lab | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| 10           | MEL264      | Heat Transfer Lab              | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| <b>Total</b> |             |                                |             | <b>22</b> | <b>13</b>              | <b>5</b> | <b>8</b> | <b>26</b>           |

**Semester - 5<sup>th</sup>**

| S. No. | Course Code | Course Title                     | Course Type | Credits | Contact Hours Per Week |   |   | Total Contact Hours |
|--------|-------------|----------------------------------|-------------|---------|------------------------|---|---|---------------------|
|        |             |                                  |             |         | L                      | T | P |                     |
| 1      | MET301      | Machine Design-I                 | Theory      | 3       | 2                      | 1 | 0 | 3                   |
| 2      | MET302      | Theory of Machines-II            | Theory      | 3       | 2                      | 1 | 0 | 3                   |
| 3      | MET303      | Material Science and Engineering | Theory      | 3       | 3                      | 0 | 0 | 3                   |
| 4      | MET304      | Applied Thermodynamics-II        | Theory      | 3       | 2                      | 1 | 0 | 3                   |
| 5      | MET305      | Industrial Engineering-I         | Theory      | 3       | 3                      | 0 | 0 | 3                   |
| 6      |             | Open Elective-I*                 | Theory      | 3       | 3                      | 0 | 0 | 3                   |

**MECHANICAL**

|                                  |                   |                           |            |           |           |          |          |           |
|----------------------------------|-------------------|---------------------------|------------|-----------|-----------|----------|----------|-----------|
| 7                                | MEL311            | Theory of Machines-II Lab | Laboratory | 1         | 0         | 0        | 2        | 2         |
| 8                                | MEL312            | Thermal Engineering Lab   | Laboratory | 1         | 0         | 0        | 2        | 2         |
| 9                                | MEL313            | Research Lab              | Laboratory | 1         | 0         | 0        | 2        | 2         |
| <b>Total</b>                     |                   |                           |            | <b>21</b> | <b>15</b> | <b>3</b> | <b>6</b> | <b>24</b> |
| <b>For B. Tech (Honors) Only</b> |                   |                           |            |           |           |          |          |           |
| 10                               | Honors Elective-I |                           | Theory     | 3         | 2         | 1        | 0        | 3         |

\*The Mechanical Engineering Department offers the following two courses as Open Elective-I to students from other departments

|   |        |                                  |        |   |   |   |   |   |
|---|--------|----------------------------------|--------|---|---|---|---|---|
| 1 | MET901 | Introduction to Mechatronics     | Theory | 3 | 2 | 1 | 0 | 3 |
| 2 | MET902 | Introduction to Electric Vehicle | Theory | 3 | 3 | 0 | 0 | 3 |

### Semester - 6<sup>th</sup>

| S. No.                           | Course Code        | Course Title               | Course Type | Credits   | Contact Hours Per Week |          |          | Total Contact Hours |
|----------------------------------|--------------------|----------------------------|-------------|-----------|------------------------|----------|----------|---------------------|
|                                  |                    |                            |             |           | L                      | T        | P        |                     |
| 1                                | MET351             | Machine Design-II          | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 2                                | MET352             | Fluid Mechanics-II         | Theory      | 3         | 2                      | 1        | 0        | 3                   |
| 3                                | MET353             | Industrial Engineering-II  | Theory      | 3         | 3                      | 0        | 0        | 3                   |
| 4                                | MAT214             | Mathematics-IV             | Theory      | 3         | 3                      | 0        | 0        | 3                   |
| 5                                | MET0##             | Elective-I                 | Theory      | 3         | 3                      | 0        | 0        | 3                   |
| 6                                |                    | Open Elective-II           | Theory      | 3         | 3                      | 0        | 0        | 3                   |
| 7                                | MEL361             | Industrial Engineering Lab | Laboratory  | 1         | 0                      | 0        | 2        | 2                   |
| 8                                | MEI371             | Industrial Training        | Practical   | 1         | 0                      | 0        | 0        | 0                   |
| 9                                | MES381             | Seminar                    | Seminar     | 1         | 0                      | 0        | 2        | 2                   |
| <b>Total</b>                     |                    |                            |             | <b>21</b> | <b>16</b>              | <b>2</b> | <b>4</b> | <b>22</b>           |
| <b>For B. Tech (Honors) Only</b> |                    |                            |             |           |                        |          |          |                     |
| 10                               | Honors Elective-II |                            | Theory      | 3         | 2                      | 1        | 0        | 3                   |

#The Mechanical Engineering Department offers the following two courses as Open Elective-II to students from other departments

|   |        |                         |        |   |   |   |   |   |
|---|--------|-------------------------|--------|---|---|---|---|---|
| 1 | MET903 | Basic Robot Mechanics   | Theory | 3 | 2 | 1 | 0 | 3 |
| 2 | MET904 | Sustainable Engineering | Theory | 3 | 3 | 0 | 0 | 3 |

### Semester - 7<sup>th</sup>

| S. No. | Course Code | Course Title                    | Course Type | Credits | Contact Hours Per Week |   |   | Total Contact Hours |
|--------|-------------|---------------------------------|-------------|---------|------------------------|---|---|---------------------|
|        |             |                                 |             |         | L                      | T | P |                     |
| 1      | MET401      | Measurement and Instrumentation | Theory      | 3       | 3                      | 0 | 0 | 3                   |
| 2      | HST052      | Engineering Economics           | Theory      | 3       | 3                      | 0 | 0 | 3                   |
| 3      | MET0##      | Elective-II                     | Theory      | 3       | 3                      | 0 | 0 | 3                   |
| 4      | MET0##      | Elective-III                    | Theory      | 3       | 3                      | 0 | 0 | 3                   |
| 5      | MET0##      | Elective-IV                     | Theory      | 3       | 3                      | 0 | 0 | 3                   |
| 6      | MEL411      | Simulation Lab                  | Laboratory  | 1       | 0                      | 0 | 2 | 2                   |
| 7      | MEP421      | Pre Project                     | Project     | 2       | 0                      | 0 | 4 | 4                   |

|                                  |                     |        |           |           |          |          |           |
|----------------------------------|---------------------|--------|-----------|-----------|----------|----------|-----------|
| <b>Total</b>                     |                     |        | <b>18</b> | <b>15</b> | <b>0</b> | <b>6</b> | <b>21</b> |
| <b>For B. Tech (Honors) Only</b> |                     |        |           |           |          |          |           |
| 8                                | Honors Elective-III | Theory | 3         | 3         | 0        | 0        | 3         |
| 9                                | Honors Elective-IV  | Theory | 3         | 3         | 0        | 0        | 3         |

**Semester - 8<sup>th</sup>**

| S. No.                           | Course Code         | Course Title | Course Type | Credits   | Contact Hours Per Week |          |           | Total Contact Hours |
|----------------------------------|---------------------|--------------|-------------|-----------|------------------------|----------|-----------|---------------------|
|                                  |                     |              |             |           | L                      | T        | P         |                     |
| 1                                | MEP451              | Project      | Project     | 6         | 0                      | 0        | 12        | 12                  |
| 2                                | MET0##              | Elective-V   | Theory      | 3         | 3                      | 0        | 0         | 3                   |
| 3                                | MET0##              | Elective-VI  | Theory      | 3         | 3                      | 0        | 0         | 3                   |
| 4                                | MET0##              | Elective-VII | Theory      | 3         | 3                      | 0        | 0         | 3                   |
| <b>Total</b>                     |                     |              |             | <b>15</b> | <b>9</b>               | <b>0</b> | <b>12</b> | <b>21</b>           |
| <b>For B. Tech (Honors) Only</b> |                     |              |             |           |                        |          |           |                     |
| 5                                | Honors Elective-V   | Theory       | 2           | 2         | 0                      | 0        | 2         |                     |
| 6                                | Honors Elective-VI  | Theory       | 3           | 3         | 0                      | 0        | 3         |                     |
| 7                                | Honors Elective-VII | Theory       | 3           | 3         | 0                      | 0        | 3         |                     |

**List of Electives the Department intends to offer for B.Tech 7<sup>th</sup> semester students**

| S. No. | Course Code | Course Title   | Course Type | Credits | Contact Hours Per Week |   |   | Total Contact Hours |
|--------|-------------|--|-------------|---------|------------------------|---|---|---------------------|
|        |             |  |             |         | L                      | T | P |                     |
| 1      | MET4002     | Material Testing Inspection & Characterization (E-III)** | Theory      | 4       | 3                      | 1 | 0 | 4                   |
| 2      | MET4003     | Refrigeration & Air Conditioning (E-III)**               | Theory      | 4       | 3                      | 1 | 0 | 4                   |
| 3      | MET4004     | Basic Fracture Mechanics (E-IV)##                        | Theory      | 4       | 3                      | 1 | 0 | 4                   |
| 4      | MET4005     | Advanced Manufacturing Technology (E-IV)##               | Theory      | 4       | 3                      | 1 | 0 | 4                   |

\*\*Students have the flexibility to choose either of the two courses as Elective-III  
 ##Students have the flexibility to choose either of the two courses as Elective-IV

| Semester | Course-1                        | Course-2                               | Course-3                     | Course-4                    | Course-5                              | Course-6                                | Course-7                                 | Course-8                         | Course-9  | Course-10 | Course-11 | Total Credits |
|----------|---------------------------------|--|------------------------------|-----------------------------|---------------------------------------|---|--|----------------------------------|---|-----------|-----------|---------------|
| III      | Chemical Process Calculations   | Process Fluid Mechanics                | Mechanical Operations        | Process Instrumentation     | Chemical Engineering Thermodynamics-I | Engineering Ethics                      | Numerical Methods                        | Mechanical Operations Laboratory |   |           |           |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 3  | 1                                |   |           |           | 22            |
|          | CET-201                         | CET-202                                | CET-203                      | CET-204                     | CET-205                               | HST-201                                 | MAT-201                                  | CEL-201                          |   |           |           |               |
| IV       | Chemical Reaction Engineering-I | Chemical Engineering Thermodynamics-II | Heat Transfer                | Chemical Process Technology | Chemical Engineering Mathematics      | Engineering Economics and Management    | Energy Technology Laboratory             | Fluid Mechanics Laboratory       |   |           |           |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 1  | 1                                |   |           |           | 20            |
|          | CET-250                         | CET-251                                | CET-252                      | CET-253                     | MAT-250                               | HST-250                                 | CEL-250                                  | CEL-251                          |   |           |           |               |
| V        | Process Equipment Design-I      | Chemical Reaction Engineering-II       | Mass Transfer-I              | Biochemical Engineering     | Elective-I                            | Institute Open Elective-I               | Heat Transfer Laboratory                 | Computer Simulation Laboratory   |   |           |           |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 1  | 1                                |   |           |           | 20            |
|          | CET-306                         | CET-307                                | CET-308                      | CET-309                     |                                       | CET-0##                                 | CEL-302                                  | CEL-303                          |   |           |           |               |
| VI       | Process Equipment Design-II     | Chemical Process Safety                | Process Dynamics and Control | Mass Transfer-II            | Elective-II                           | Institute Open Elective-II              | Chemical Reaction Engineering Laboratory | Mass Transfer Laboratory         | Industrial / Research Training and Presentation | Seminar   |           |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 1  | 1                                | 1   | 1         |           | 22            |
|          | CET-354                         | CET-355                                | CET-356                      | CET-357                     | CET-0##                               | CET-0##                                 | CEL-352                                  | CEL-353                          | CEI-350   | CES-350   |           |               |
| VII      | Transport Phenomena             | Process Economics and Plant Design     | Elective-III                 | Elective-IV                 | Elective-V                            | Process Dynamics and Control Laboratory | Biochemical Engineering Laboratory       | Pre-Project Work                 |   |           |           |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 1                                       | 1  | 2                                |   |           |           | 19            |
|          | CET-410                         | CET-411                                | CET-0##                      | CET-0##                     | CET-0##                               | CEL-404                                 | CEL-405                                  | CEP-401                          |   |           |           |               |
| VIII     | Elective-VI                     | Elective-VII                           | Elective-VIII                | Project Work                |                                       |   |  |                                  |   |           |           |               |
|          | 3                               | 3                                      | 3                            | 6                           |                                       |   |  |                                  |   |           |           | 15            |
|          | CET-0##                         | CET-0##                                | CET-0##                      | CEP-450                     |                                       |   |  |                                  |   |           |           |               |
|          |                                 |  |                              |                             |                                       |   |  |                                  |   |           |           | 160           |

Chemical Engineering Department: Implemented for Batch 2023 and onwards Total Required Credits: Minimum = 180 (1<sup>st</sup> + 2<sup>nd</sup> Semester = 42)

| Semester | Course-1                        | Course-2                               | Course-3                     | Course-4                    | Course-5                              | Course-6                                | Course-7                                 | Course-8                         | Course-9  | Course-10          | Course-11          | Total Credits |
|----------|---------------------------------|--|------------------------------|-----------------------------|---------------------------------------|---|--|----------------------------------|---|--------------------|--------------------|---------------|
| III      | Chemical Process Calculations   | Process Fluid Mechanics                | Mechanical Operations        | Process Instrumentation     | Chemical Engineering Thermodynamics-I | Engineering Ethics                      | Numerical Methods                        | Mechanical Operations Laboratory |   |                    |                    |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 3  | 1                                |   |                    |                    | 22            |
|          | CET-201                         | CET-202                                | CET-203                      | CET-204                     | CET-205                               | HST-201                                 | MAT-201                                  | CEL-201                          |   |                    |                    |               |
| IV       | Chemical Reaction Engineering-I | Chemical Engineering Thermodynamics-II | Heat Transfer                | Chemical Process Technology | Chemical Engineering Mathematics      | Engineering Economics and Management    | Energy Technology Laboratory             | Fluid Mechanics Laboratory       |   |                    |                    |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 1  | 1                                |   |                    |                    | 20            |
|          | CET-250                         | CET-251                                | CET-252                      | CET-253                     | MAT-250                               | HST-250                                 | CEL-250                                  | CEL-251                          |   |                    |                    |               |
| V        | Process Equipment Design-I      | Chemical Reaction Engineering-II       | Mass Transfer-I              | Biochemical Engineering     | Elective-I                            | Institute Open Elective-I               | Heat Transfer Laboratory                 | Computer Simulation Laboratory   | Honors Elective-I                               |                    |                    |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 1  | 1                                | 3   |                    |                    | 23            |
|          | CET-306                         | CET-307                                | CET-308                      | CET-309                     |                                       | CET-0##                                 | CEL-302                                  | CEL-303                          | MAT-029   |                    |                    |               |
| VI       | Process Equipment Design-II     | Chemical Process Safety                | Process Dynamics and Control | Mass Transfer-II            | Elective-II                           | Institute Open Elective-II              | Chemical Reaction Engineering Laboratory | Mass Transfer Laboratory         | Industrial / Research Training and Presentation | Seminar            | Honors Elective-II |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 3                                       | 1  | 1                                | 1   | 1                  | 3                  | 25            |
|          | CET-354                         | CET-355                                | CET-356                      | CET-357                     | CET-0##                               | CET-0##                                 | CEL-352                                  | CEL-353                          | CEI-350   | CES-350            | CET-030            |               |
| VII      | Transport Phenomena             | Process Economics and Plant Design     | Elective-III                 | Elective-IV                 | Elective-V                            | Process Dynamics and Control Laboratory | Biochemical Engineering Laboratory       | Pre-Project Work                 | Honors Elective-III                             | Honors Elective-IV |                    |               |
|          | 3                               | 3                                      | 3                            | 3                           | 3                                     | 1                                       | 1  | 2                                | 3   | 3                  |                    | 25            |
|          | CET-410                         | CET-411                                | CET-0##                      | CET-0##                     | CET-0##                               | CEL-404                                 | CEL-405                                  | CEP-401                          | CET-031   | HST-032            |                    |               |
| VIII     | Elective-VI                     | Elective-VII                           | Elective-VIII                | Project Work                | Honors Elective-V                     | Honors Elective-VI                      | Honors Elective-VII                      | Honors Elective-VIII             |   |                    |                    |               |
|          | 3                               | 3                                      | 3                            | 6                           | 3                                     | 3                                       | 1  | 1                                |   |                    |                    | 23            |
|          | CET-0##                         | CET-0##                                | CET-0##                      | CEP-450                     | CET-033                               | CET-034                                 | CET-035                                  | CET-036                          |   |                    |                    |               |
|          |                                 |  |                              |                             |                                       |   |  |                                  |   |                    |                    | 180           |

CHEMICAL

| 3 <sup>rd</sup> Semester   |            |   |           |          |          |           |
|----------------------------|------------|---|-----------|----------|----------|-----------|
| S.No.                      | Course No. | Subjects                                      | L         | T        | P        | Credits   |
| 1.                         | CET-201    | Chemical Process Calculations                 | 2         | 1        | 0        | 3         |
| 2.                         | CET-202    | Process Fluid Mechanics                       | 2         | 1        | 0        | 3         |
| 3.                         | CET-203    | Mechanical Operations                         | 2         | 1        | 0        | 3         |
| 4.                         | CET-204    | Process Instrumentation                       | 2         | 1        | 0        | 3         |
| 5.                         | CET-205    | Chemical Engineering Thermodynamics-I         | 2         | 1        | 0        | 3         |
| 6.                         | HST-201    | Engineering Ethics                            | 2         | 1        | 0        | 3         |
| 7.                         | MAT-201    | Numerical Methods                             | 2         | 1        | 0        | 3         |
| 8.                         | CEL-201    | Mechanical Operations Laboratory              | 0         | 0        | 2        | 1         |
| <b>Total</b>               |            |   | <b>14</b> | <b>7</b> | <b>2</b> | <b>22</b> |
| 4 <sup>th</sup> Semester   |            |   |           |          |          |           |
| S.No.                      | Course No. | Subjects                                      | L         | T        | P        | Credits   |
| 1.                         | CET-250    | Chemical Reaction Engineering-I               | 2         | 1        | 0        | 3         |
| 2.                         | CET-251    | Chemical Engineering Thermodynamics-II        | 2         | 1        | 0        | 3         |
| 3.                         | CET-252    | Heat Transfer                                 | 2         | 1        | 0        | 3         |
| 4.                         | CET-253    | Chemical Process Technology                   | 2         | 1        | 0        | 3         |
| 5.                         | MAT-250    | Chemical Engineering Mathematics              | 2         | 1        | 0        | 3         |
| 6.                         | HST-250    | Engineering Economics and Management          | 2         | 1        | 0        | 3         |
| 7.                         | CEL-250    | Energy Technology Laboratory                  | 0         | 0        | 2        | 1         |
| 8.                         | CEL-251    | Fluid Mechanics Laboratory                    | 0         | 0        | 2        | 1         |
| <b>Total</b>               |            |   | <b>12</b> | <b>6</b> | <b>4</b> | <b>20</b> |
| 5 <sup>th</sup> Semester   |            |   |           |          |          |           |
| S.No.                      | Course No. | Subjects                                      | L         | T        | P        | Credits   |
| 1.                         | CET-306    | Process Equipment Design-I                    | 2         | 1        | 0        | 3         |
| 2.                         | CET-307    | Chemical Reaction Engineering-II              | 2         | 1        | 0        | 3         |
| 3.                         | CET-308    | Mass Transfer -I                              | 2         | 1        | 0        | 3         |
| 4.                         | CET-309    | Biochemical Engineering                       | 2         | 1        | 0        | 3         |
| 5.                         |            | Elective-I                                    | 2         | 1        | 0        | 3         |
| 6.                         |            | Institute Open Elective-I                     | 2         | 1        | 0        | 3         |
| 7.                         | CEL-302    | Heat Transfer Laboratory                      | 0         | 0        | 2        | 1         |
| 8.                         | CEL-303    | Computer Simulation Laboratory                | 0         | 0        | 2        | 1         |
| <b>Total</b>               |            |   | <b>12</b> | <b>6</b> | <b>4</b> | <b>20</b> |
| B. Tech Honours Elective-I |            |   |           |          |          |           |
| 9.                         | MAT-029    | Applied Mathematics for Chemical Engineers    | 2         | 1        | 0        | 3         |
| <b>Total</b>               |            |   | <b>14</b> | <b>7</b> | <b>4</b> | <b>23</b> |
| 6 <sup>th</sup> Semester   |            |   |           |          |          |           |
| S.No.                      | Course No. | Subjects                                      | L         | T        | P        | Credits   |
| 1.                         | CET-354    | Process Equipment Design-II                   | 2         | 1        | 0        | 3         |
| 2.                         | CET-355    | Chemical Process Safety                       | 2         | 1        | 0        | 3         |
| 3.                         | CET-356    | Process Dynamics and Control                  | 2         | 1        | 0        | 3         |
| 4.                         | CET-357    | Mass Transfer -II                             | 2         | 1        | 0        | 3         |
| 5.                         |            | Elective-II                                   | 2         | 1        | 0        | 3         |
| 6.                         |            | Institute Open Elective-II                    | 2         | 1        | 0        | 3         |
| 7.                         | CEL-352    | Chemical Reaction Engineering Laboratory      | 0         | 0        | 2        | 1         |
| 8.                         | CEL-353    | Mass Transfer Laboratory                      | 0         | 0        | 2        | 1         |
| 9.                         | CEI-350    | Industrial/Research Training and Presentation | 0         | 0        | 2        | 1         |
| 10.                        | CES-350    | Seminar                                       | 0         | 0        | 2        | 1         |

|                                      |         |   |                      |                  |          |                |           |
|--------------------------------------|---------|---|----------------------|------------------|----------|----------------|-----------|
|                                      |         |   | <b>Total</b>         | <b>12</b>        | <b>6</b> | <b>8</b>       | <b>22</b> |
| <b>B. Tech Honours Elective-II</b>   |         |   |                      |                  |          |                |           |
| 11.                                  | CET-030 | Membrane Science and Engineering        | 2                    | 1                | 0        | 3              |           |
|                                      |         |   | <b>Total</b>         | <b>14</b>        | <b>7</b> | <b>8</b>       | <b>25</b> |
| <b>7<sup>th</sup> Semester</b>       |         |   |                      |                  |          |                |           |
| <b>S. No.</b>                        |         | <b>Subjects</b>                         | <b>L</b>             | <b>T</b>         | <b>P</b> | <b>Credits</b> |           |
| 1.                                   | CEP-401 | Pre-project work                        | 0                    | 0                | 4        | 2              |           |
| 2.                                   | CET-410 | Transport Phenomena                     | 2                    | 1                | 0        | 3              |           |
| 3.                                   | CET-411 | Process Economics and Plant Design      | 2                    | 1                | 0        | 3              |           |
| 4.                                   |         | Elective-III                            | 2                    | 1                | 0        | 3              |           |
| 5.                                   |         | Elective-IV                             | 2                    | 1                | 0        | 3              |           |
| 6.                                   |         | Elective-V                              | 2                    | 1                | 0        | 3              |           |
| 7.                                   | CEL-404 | Process Dynamics and Control Laboratory | 0                    | 0                | 2        | 1              |           |
| 8.                                   | CEL-405 | Biochemical Engineering Laboratory      | 0                    | 0                | 2        | 1              |           |
|                                      |         |   | <b>Total</b>         | <b>10</b>        | <b>5</b> | <b>8</b>       | <b>19</b> |
| <b>B. Tech Honours Elective-III</b>  |         |   |                      |                  |          |                |           |
| 10.                                  | CET-031 | Risk Analysis and Hazards               | 2                    | 1                | 0        | 3              |           |
| <b>B. Tech Honours Elective-IV</b>   |         |   |                      |                  |          |                |           |
| 11.                                  | HST-032 | Innovation Management                   | 2                    | 1                | 0        | 3              |           |
|                                      |         |   | <b>Total</b>         | <b>14</b>        | <b>7</b> | <b>8</b>       | <b>25</b> |
| <b>8<sup>th</sup> Semester</b>       |         |   |                      |                  |          |                |           |
| <b>S. No.</b>                        |         | <b>Subjects</b>                         | <b>L</b>             | <b>T</b>         | <b>P</b> | <b>Credits</b> |           |
| 1.                                   | CEP-450 | Project Work                            | 0                    | 0                | 12       | 6              |           |
| 2.                                   |         | Elective- VI                            | 2                    | 1                | 0        | 3              |           |
| 3.                                   |         | Elective- VII                           | 2                    | 1                | 0        | 3              |           |
| 4.                                   |         | Elective - VIII                         | 2                    | 1                | 0        | 3              |           |
|                                      |         |   | <b>Total</b>         | <b>6</b>         | <b>3</b> | <b>12</b>      | <b>15</b> |
| <b>B. Tech Honours Elective-V</b>    |         |   |                      |                  |          |                |           |
| 5.                                   | CET-033 | Multi-Component Distillation            | 2                    | 1                | 0        | 3              |           |
| <b>B. Tech Honours Elective-VI</b>   |         |   |                      |                  |          |                |           |
| 6.                                   | CET-034 | Heterogeneous Catalysis                 | 2                    | 1                | 0        | 3              |           |
| <b>B. Tech Honours Elective-VII</b>  |         |   |                      |                  |          |                |           |
| 7.                                   | CEL-035 | Advanced Computational Laboratory       | 0                    | 0                | 2        | 1              |           |
| <b>B. Tech Honours Elective-VIII</b> |         |   |                      |                  |          |                |           |
| 8.                                   | CEL-036 | Instrumentation Laboratory              | 0                    | 0                | 2        | 1              |           |
|                                      |         |   | <b>Total</b>         | <b>10</b>        | <b>5</b> | <b>16</b>      | <b>23</b> |
|                                      |         |   | <b>Total Credits</b> | <b>118 (138)</b> |          |                |           |

## ELECTIVE COURSES

| <b>Course. No.</b> | <b>5th Semester Elective Courses</b>                        | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credit</b> |
|--------------------|---|----------|----------|----------|---------------|
| MAT-001            | Operation Research  | 2        | 1        | 0        | 3             |
| CET-002            | Material Science and Technology                             | 2        | 1        | 0        | 3             |
| CET-003            | Cement Technology   | 2        | 1        | 0        | 3             |
| CET-004            | Swayam Online Course1                                       |          |          |          | 3             |
| CET-005            | Swayam Online Course2                                       |          |          |          | 3             |
| <b>Course. No.</b> | <b>Institute Open Elective-I (5<sup>th</sup> Semester)</b>  | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credit</b> |
| CET B1 901         | Energy Technology   | 2        | 1        | 0        | 3             |
| CET B2 902         | Membrane Science and Engineering                            | 2        | 1        | 0        | 3             |
| <b>Course. No.</b> | <b>6<sup>th</sup> Semester Elective Courses</b>             | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credit</b> |
| CET-008            | Industrial Pollution Abatement                              | 2        | 1        | 0        | 3             |
| CET-009            | Instrumental Methods of Analysis                            | 2        | 1        | 0        | 3             |
| CET-010            | Clean Technology in Process Industries                      | 2        | 1        | 0        | 3             |
| CET-011            | Swayam Online Course1                                       |          |          |          | 3             |
| CET-012            | Swayam Online Course2                                       |          |          |          | 3             |
| <b>Course. No.</b> | <b>Institute Open Elective-II (6<sup>th</sup> Semester)</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credit</b> |
| CET B1 951         | Petroleum Refining  | 2        | 1        | 0        | 3             |
| CET B2 952         | Waste Management  | 2        | 1        | 0        | 3             |
| <b>Course. No.</b> | <b>7<sup>th</sup> Semester Elective Courses</b>             | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credit</b> |
| CET-015            | Nano-Science and Technology                                 | 2        | 1        | 0        | 3             |
| CET-016            | Microfluidics   | 2        | 1        | 0        | 3             |
| CET-017            | Advanced Separation Processes                               | 2        | 1        | 0        | 3             |
| CET-018            | Process Heat Integration                                    | 2        | 1        | 0        | 3             |
| CET-019            | Polymer Science and Engineering                             | 2        | 1        | 0        | 3             |
| CET-020            | Energy Technology   | 2        | 1        | 0        | 3             |
| CET-021            | Swayam Online Course  |          |          |          | 3             |
| <b>Course. No.</b> | <b>8<sup>th</sup> Semester Elective Courses</b>             | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credit</b> |
| CET-022            | Environmental Engineering                                   | 2        | 1        | 0        | 3             |
| CET-023            | Computational Fluid Dynamics                                | 2        | 1        | 0        | 3             |
| CET-024            | Modeling and Simulation of Chemical Process Systems         | 2        | 1        | 0        | 3             |
| CET-025            | Bioresource Technology                                      | 2        | 1        | 0        | 3             |
| CET-026            | Fuel Cell Technology  | 2        | 1        | 0        | 3             |
| CET-027            | Petroleum Refining  | 2        | 1        | 0        | 3             |
| CET-028            | Swayam Online Course  |          |          |          | 3             |

### Nomenclature

|    |   |
|----|---|
| CE | Chemical Engineering subject                      |
| MA | Mathematics Department subject                    |
| HS | Humanities and Social Sciences Department subject |
| T  | Theory  |
| L  | Lab course  |
| P  | Project/Dissertation                              |
| S  | Seminar   |
| I  | Industrial Training & Presentation                |

- The first numeral indicates the year of the course, except for elective courses, which are assigned a '0' (zero).
- The second and third numerals represent the unique course number for even semester courses, starting from 01 to 49, and odd semester courses, starting from 50 to 99.
- Online courses, such as those on SWAYAM/NPTEL, will be offered before the start of the semester and will be managed by a faculty mentor.

Electronics & Communication Engineering: Implemented from Batch 2023 Total Required Credits: Minimum=160 (I + II Semester =42)

| Semester | Course-1                  | Course-2                     | Course-3                             | Course-4                             | Course-5  | Course-6              | Course-7                   | Course-8               | Course-9                      | Course-10           | Course-11 | Total Credits |
|----------|---------------------------|------------------------------|--------------------------------------|--------------------------------------|---|-----------------------|----------------------------|------------------------|-------------------------------|---------------------|-----------|---------------|
| III      | Electronics-I             | Network Analysis             | Signals and Systems                  | Electronic Engineering Materials     | Philosophy for Engineers: Society, Culture and Ethics | Mathematics III       | Electronics-I Lab.         | Circuit Analysis Lab   | Signals & Systems Lab         |                     |           |               |
|          | 3                         | 3                            | 3                                    | 3                                    | 3   | 3                     | 1                          | 1                      | 1                             |                     |           | 21            |
|          | ECT201                    | ECT202                       | ECT203                               | ECT208                               | HST009  | MAT203                | ECL204                     | ECL205                 | ECL209                        |                     |           |               |
| IV       | Electronics-II            | Digital Elect.& Logic Design | Communication-I                      | Applied EMF& Waves                   | Control Systems                                       | Mathematics IV        | Electronics-II Lab.        | DELD Lab               | Communication-I Lab.          |                     |           |               |
|          | 3                         | 3                            | 3                                    | 3                                    | 3   | 3                     | 1                          | 1                      | 1                             |                     |           | 21            |
|          | ECT250                    | ECT251                       | ECT252                               | ECT253                               | ECT259  | MAT213                | ECL254                     | ECL255                 | ECL256                        |                     |           |               |
| V        | Microprocessor            | Electronic Devices           | Communication - II                   | Antenna and Wave Propagation         | Mathematics-V   | Institute Elective I  | Microprocessor Lab.        | Communication - II Lab |                               |                     |           |               |
|          | 3                         | 3                            | 3                                    | 3                                    | 3   | 3                     | 1                          | 1                      |                               |                     |           | 20            |
|          | ECT301                    | ECT302                       | ECT303                               | ECT304                               | MAT301  | DPTBy9xx              | ECL305                     | ECL306                 |                               |                     |           |               |
| VI       | Digital Signal Processing | VLSI Design                  | Computer Organization & Architecture | Data Communication                   | Elective II   | Institute Elective-II | Seminar                    | VLSI Design Lab        | Digital Signal Processing Lab | Industrial Training |           |               |
|          | 3                         | 3                            | 3                                    | 3                                    | 3   | 3                     | 1                          | 1                      | 1                             | 1                   |           | 22            |
|          | ECT350                    | ECT351                       | ECT352                               | ECT353                               | ECT0xx  | DPTBy9xx              | ECS355                     | ECL356                 | ECL357                        | ECI358              |           |               |
| VII      | Microwave Engineering     | Wireless Communication       | Electronic M&I                       | Industrial Organization & Management | Project pre-work                                      | Elective IV           | Microwave Engineering Lab. | EDA Tools I            |                               |                     |           |               |
|          | 3                         | 3                            | 3                                    | 3                                    | 2   | 3                     | 1                          | 1                      |                               |                     |           | 19            |
|          | ECT401                    | ECT402                       | ECT403                               | HST010                               | ECP404  | ECT0xx                | ECL405                     | ECL407                 |                               |                     |           |               |
| VIII     | Project Major             | Elective VI                  | Elective-VII                         | Elective-VIII                        |   |                       |                            |                        |                               |                     |           |               |
|          | 6                         | 3                            | 3                                    | 3                                    |   |                       |                            |                        |                               |                     |           | 15            |
|          | ECP450                    | ECT0xx                       | ECT0xx                               | ECT0xx                               |   |                       |                            |                        |                               |                     |           |               |
|          |                           |                              |                                      |                                      |   |                       |                            |                        |                               |                     |           | 160           |

ECE



**Department of Electronics and Communication Engineering  
National Institute of Technology, Srinagar-190006**

**List of Electives in Groups**

| <b>Subject Code</b>                  | <b>Subject Name</b>                                 |
|--------------------------------------|---|
| <b>Electronics and Systems Group</b> |   |
| ECT001                               | Advanced Microcontrollers                           |
| ECT002                               | Analog CMOS design                                  |
| ECT003                               | Biomedical Engineering                              |
| ECT004                               | Mechatronics  |
| ECT005                               | Mixed Signal Design                                 |
| ECT006                               | Molecular Electronics                               |
| ECT007                               | Nano-Technology                                     |
| ECT008                               | Network Synthesis                                   |
| ECT009                               | Non-Linear Integrated Circuit                       |
| ECT010                               | Opto Electronic Devices                             |
| ECT011                               | Solar PhotoVoltaics                                 |
| ECT012                               | General Purpose Interface Bus Measurement Technique |
| ECT013                               | Quantum Devices and Computing                       |
| ECT014                               | Radio Frequency Design                              |
| ECT015                               | SCADA   |
| ECT016                               | System Design                                       |
| ECT017                               | VLSI Technology                                     |
| <b>Communication Group</b>           |   |
| ECT031                               | Error Control Codes                                 |
| ECT032                               | Information Theory                                  |
| ECT033                               | Millimeter Wave Communication                       |
| ECT034                               | Optical Communication                               |



**Department of Electronics and Communication Engineering  
National Institute of Technology, Srinagar-190006**

|   |  |
|---|--|
| ECT035  | Radar Systems                                |
| ECT036  | Smart grid communication                     |
| ECT037  | Telemedicine                                 |
| ECT038  | TV Engineering                               |
| ECT039  | 5G/6G Communication                          |
| <b>Computer Science and Engineering Group</b> |  |
| ECT061  | Advance Microprocessors                      |
| ECT062  | Artificial Intelligence and Machine Learning |
| ECT063  | Computer and Network security                |
| ECT064  | Design and analysis of algorithms            |
| ECT065  | GIS and Remote Sensing                       |
| ECT066  | Image Processing                             |
| ECT067  | Multimedia Information Systems               |
| ECT068  | Python Programming                           |
| ECT069  | Real Time Systems                            |
| ECT070  | Software Engineering                         |
| ECT071  | Visual Programming                           |
| <b>Other Group</b>                            |  |
| EET081  | Advanced Power Electronics                   |
| EET082  | Power Systems                                |
| MAT083  | Discrete Mathematics                         |
| MAT084  | Fuzzy logic and neural networks              |
| MAT085  | Numerical Analysis and Techniques            |
| MAT086  | Optimization Techniques                      |
| HST087  | HR Management                                |
| HST088  | IT in Management                             |



**Metallurgical and Materials Engineering Department: Implemented for Batch 2023 and onwards. Total Required Credits: Honours = 180 (I + II Semester =42)**

| Semester | Course-1  | Course-2   | Course-3   | Course-4  | Course-5  | Course-6  | Course-7   | Course-8   | Course-9  | Course-10   | Course-11   | Total Credits |
|----------|---|--|--|---|---|---|--|--|---|---|---|---------------|
| III      | Electronic, Magnetic and Di-electric Materials    | Thermodynamics of Materials  | Physical Metallurgy  | Mineral Dressing & Principles of Extractive Metallurgy  | Probability and Statistics  | Entrepreneurship Development  | Laboratory Practice in Physical Metallurgy                                     | Laboratory Practice in Mineral Dressing & Principles of Extractive Metallurgy                        |   |   |   |               |
|          | 3   | 3  | 3  | 3   | 3   | 3   | 1  | 1  |   |   |   | 20            |
|          | MMT: 201  | MMT: 202   | MMT: 203   | MMT: 204  | MAT: 206  | HST: 006  | MML: 205   | MML: 206   |   |   |   |               |
| IV       | Phase Transformation and Heat Treatment of Metals | Kinetics of Metallurgical Processes  | Non-Ferrous Metal Extraction   | Joining of Materials  | Numerical Methods   | Engineering Economics and Management  | Laboratory Practice in Heat Treatment  | Laboratory Practice in Joining of Materials  |   |   |   |               |
|          | 3   | 3  | 3  | 3   | 3   | 3   | 1  | 1  |   |   |   | 20            |
|          | MMT: 250  | MMT: 251   | MMT: 252   | MMT: 253  | MAT: 216  | HST: 004  | MML: 254   | MML: 255   |   |   |   |               |
| V        | Corrosion Engineering                             | Iron Making  | Mechanical Behaviour of Materials  | Materials Characterization  | <b>Professional Elective – I</b><br>Advanced Manufacturing Processes / Physical Metallurgy of Light Metals and Alloys | <b>Institute Open Elective – I</b><br>(For Non-MMED)<br>Electrical and Electronic Engineering Materials / Introduction to Materials Science & Engineering | Laboratory Practice in Corrosion Engineering                                   | Laboratory Practice in Mechanical Behaviour of Materials   | Laboratory Practice in Materials Characterization                                 | <b>Honours Elective-I</b><br>Introduction to Energy Materials / Transport Phenomena in Materials Engineering  |   |               |
|          | 3   | 3  | 3  | 3   | 3   | 3   | 1  | 1  | 1   | 3   |   | 24            |
|          | MMT: 301  | MMT: 302   | MMT: 303   | MMT: 304  | MMT: 001 / MMT: 002   | MMT : B1 901 / MMT: B2 902  | MML: 308   | MML: 309   | MML: 310  | MMT: 003 / MMT: 004   |   |               |
| VI       | Ceramic Technology                                | Steel Making   | Powder Metallurgy  | Mechanical Working of Materials   | <b>Professional Elective – II</b><br>Thermal Analysis & Spectroscopy / Fuels, Furnaces & Refractories                 | <b>Institute Open Elective – II</b><br>(For Non-MMED)<br>Nanomaterials / Energy Materials   | Laboratory Practice in Ceramic Technology                                      | Laboratory Practice in Mechanical Working of Materials   | Industrial Training / Internship  | Seminar   | <b>Honours Elective - II</b><br>Protective Coatings / Electron Microscopy |               |
|          | 3   | 3  | 3  | 3   | 3   | 3   | 1  | 1  | 1   | 1   | 3   | 25            |
|          | MMT: 351  | MMT: 352   | MMT: 353   | MMT: 354  | MMT: 050 / MMT: 051   | MMT : B1 951 / MMT: B2 952  | MML: 358   | MML: 359   | MMI: 360  | MMS: 361  | MMT: 052 / MMT: 053   |               |
| VII      | Metal Casting                                     | Polymer Technology   | <b>Professional Elective - III</b><br>Composite Materials) / High Temperature Materials                      | <b>Professional Elective - IV</b><br>Selection and properties of materials / Tribology of Engineering Materials | <b>Professional Elective - V</b><br>Science and Technology of Thin Films / Thermo-mechanical processing               | Laboratory Practice in Metal Casting  | Laboratory Practice in Polymer Technology                                      | Project Preliminary Work   | <b>Honours Elective-III</b><br>Additive Manufacturing / Creep, Fatigue & Fracture | <b>Honours Elective-IV</b><br>Nano Materials / Fundamentals of Electro-Chemistry / Severe plastic deformation |   |               |
|          | 3   | 3  | 3  | 3   | 3   | 1   | 1  | 2  | 3   | 3   |   | 25            |
|          | MMT: 401  | MMT: 402   | MMT: 005 / MMT: 006  | MMT: 007 / MMT: 008   | MMT: 009 / MMT: 010   | MML: 409  | MML: 410   | MMP: 411   | MMT: 011 / MMT: 012   | MMT: 013 / MMT: 014 / MMT: 015  |   |               |
| VIII     | Non-Destructive Testing and Evaluation            | <b>Professional Elective – VI</b><br>Failure Analysis / Alternate Methods of Iron Making | <b>Professional Elective - VII</b><br>Introduction to Multicomponent and High-Entropy Alloys / Bio-Materials | Laboratory Practice in Non-Destructive Testing  | Major Project   | <b>Honours Elective - V</b><br>Secondary Steel Making / Smart Materials   | <b>Honours Elective - VI</b><br>Porous Materials / Advanced Continuous Casting | <b>Honours Elective - VII</b><br>Dislocation & Plasticity / Surface Engineering / Fracture Mechanics |   |   |   |               |
|          | 3   | 3  | 3  | 1   | 6   | 2   | 3  | 3  |   |   |   | 24            |
|          | MMT: 451  | MMT: 054 / MMT: 055  | MMT: 056 / MMT: 057  | MML:456   | MMP:457   | MMT: 058 / MMT: 059   | MMT: 060 / MMT: 061  | MMT: 062 / MMT: 063 / MMT: 064   |   |   |   |               |
|          |   |  |  |   |   |   |  |  |   |   |   | <b>180</b>    |



| Semester - 8 |  |      |            |              |      |      |  |   |    |
|--------------|--|------|------------|--------------|------|------|--|---|----|
| MMT: 451     | Non-Destructive Testing and Evaluation                 | CBCS | COMPULSORY | THEORY       | CBCS | CORE |  | 3 | NO |
| MMT: 0XX     | Professional Elective - VI                             | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 0XX     | Professional Elective - VII                            | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MML: 456     | Laboratory Practice in Non-Destructive Testing         | CBCS | COMPULSORY | PRACTICAL    | CBCS | CORE |  | 1 | NO |
| MMP: 457     | Major Project  | CBCS | COMPULSORY | DISSERTATION | CBCS | CORE |  | 6 | NO |
| MMT: 457     | Honours Elective - V                                   | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 2 | NO |
| MMT: 0XX     | Honours Elective - VI                                  | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 0XX     | Honours Elective - VI                                  | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 0XX     | Honours Elective - VII                                 | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
|              |  |      |            |              |      |      |  |   |    |
|              |  |      |            |              |      |      |  |   |    |
| Electives    |  |      |            |              |      |      |  |   |    |
|              |  |      |            |              |      |      |  |   |    |
|              |  |      |            |              |      |      |  | 3 | NO |
| MMT: 001     | Advanced Manufacturing Processes                       | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 002     | Physical Metallurgy of Light Metals and Alloys         | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 003     | Introduction to Energy Materials                       | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 004     | Transport Phenomena in Materials Engineering           | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 005     | Composite Materials                                    | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 006     | High Temperature Materials                             | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 007     | Selection and Properties of Materials                  | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 008     | Tribology of Engineering Materials                     | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 009     | Science and Technology of Thin Films                   | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 010     | Thermo-mechanical Processing                           | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 011     | Additive Manufacturing                                 | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 012     | Creep, Fatigue & Fracture                              | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 013     | Nano Materials   | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 014     | Fundamentals of Electro-chemistry                      | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 015     | Severe Plastic Deformation                             | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 050     | Thermal Analysis and Spectroscopy                      | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 051     | Fuels, Furnaces and Refractories                       | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 052     | Protective Coatings                                    | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 053     | Electron Microscopy                                    | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 054     | Failure Analysis                                       | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 055     | Alternate Methods of Iron Making                       | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 056     | Introduction to Multicomponent and High Entropy Alloys | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 057     | Bio-Materials  | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 2 | NO |
| MMT: 058     | Secondary Steel Making                                 | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 2 | NO |
| MMT: 059     | Smart Materials  | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 060     | Porous Materials                                       | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 061     | Advanced Continuous Casting                            | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 062     | Dislocation and Plasticity                             | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 063     | Surface Engineering                                    | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |
| MMT: 064     | Fracture Mechanics                                     | CBCS | ELECTIVE   | THEORY       | CBCS | DSE  |  | 3 | NO |

| COURSE_CODE | COURSE_NAME                                     | CATEGORY | COURSE_CATEGORY | TYPE   | CREDIT_SCHEME | CBCS_CATEGORY | DISCIPLINE | MAXIMUM_CREDIT | QUALIFYING_IN_NATURE |
|-------------|---|----------|-----------------|--------|---------------|---------------|------------|----------------|----------------------|
| Semester 5  |   |          |                 |        |               |               |            |                |                      |
| MMT: B1 901 | Electrical and Electronic Engineering Materials | CBCS     | ELECTIVE        | THEORY | CBCS          | OE            |            | 3              | NO                   |
| MMT: B2 902 | Introduction to Materials Science & Engineering | CBCS     | ELECTIVE        | THEORY | CBCS          | OE            |            | 3              | NO                   |
| Semester 6  |   |          |                 |        |               |               |            |                |                      |
| MMT: B1 951 | Nanomaterials                                   | CBCS     | ELECTIVE        | THEORY | CBCS          | OE            |            | 3              | NO                   |
| MMT: B2 952 | Energy Materials                                | CBCS     | ELECTIVE        | THEORY | CBCS          | OE            |            | 3              | NO                   |



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विद्युत अभियांत्रिकी विभाग  
राष्ट्रीय प्रौद्योगिकी संस्थान श्रीनगर

(शिक्षा मंत्रालय, भारत सरकार के तत्वावधान में राष्ट्रीय महत्व का एक स्वायत्त संस्थान)

हजरतबल, श्रीनगर, जम्मू-कश्मीर, 190006, भारत

DEPARTMENT OF ELECTRICAL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR  
(An autonomous Institute of National Importance under the aegis of Ministry of  
Education, Govt. of India)  
Hazratbal, Srinagar Jammu and Kashmir, 190006, INDIA

No. NIT/elect/25/500

Dated: 11<sup>th</sup> July 2025

Chairman, ERP/Samarth

**Subject:** Submission of Updated Scheme and Electives for Electrical Engineering Programs

This is in response to Office Letter Nos. NIT/IA/2025/94 and NIT/IA/2025/95, both dated July 09, 2025. Kindly note the following:

1. The updated B.Tech. scheme for the Electrical Engineering program, incorporating the recent changes approved by the 36<sup>th</sup> Senate of the Institute, is enclosed with this letter.
2. As per the old curriculum, no electives are offered to Electrical Engineering students in the 7<sup>th</sup> Semester. However, Program Electives introduced in the new curriculum for 5<sup>th</sup> Semester students are included in the enclosed scheme.
3. The list of electives that the department will be offering to M.Tech. students in the 1<sup>st</sup> and 3<sup>rd</sup> Semesters is provided below.

| S/N | M.Tech.                             | Subject      | Semester        | Elective   |
|-----|-------------------------------------|--------------|-----------------|--|
| 1.  | Electrical Power & Energy Systems   | Elective I   | 1 <sup>st</sup> | EEM 111 (Selected Topics in Power & Energy Systems)  |
| 2.  |                                     | Elective III | 3 <sup>rd</sup> | EEM 128 (Flexible AC Transmission Systems)   |
| 3.  |                                     | Elective IV  |                 | EEM 112 (Intelligent Control of Electrical Energy Systems)   |
| 4.  | Power Electronics & Electric Drives | Elective I   | 1 <sup>st</sup> | EEM 127 (Modeling and Simulation of Power Electronic Systems)<br>MTM 101 (Optimisation Techniques) |
| 5.  |                                     | Elective III | 3 <sup>rd</sup> | EEM 128 (Flexible AC Transmission Systems)<br>EEM 134 (Modern power Electronics)                   |
| 6.  |                                     | Elective IV  |                 | EEM 129 (Hybrid Electric Vehicles)   |
| 7.  |                                     | Elective V   |                 | EEM 105 (Renewable Sources of Energy)  |

Prof. M. D. Mufti

Head Electrical Engineering Department



विद्युत अभियांत्रिकी विभाग  
राष्ट्रीय प्रौद्योगिकी संस्थान श्रीनगर  
DEPARTMENT OF ELECTRICAL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

**COURSE STRUCTURE**  
**B.Tech. 3rd Semester**

| Course Code  | Course Title                        | L | T | P | C         |
|--------------|-------------------------------------|---|---|---|-----------|
| MAT202       | Mathematics III                     | 3 | 0 | 0 | 3         |
| EET201       | Electric Circuit Analysis           | 2 | 1 | 0 | 3         |
| EET202       | Electric Machines I                 | 2 | 1 | 0 | 3         |
| EET203       | Signals & Systems                   | 2 | 1 | 0 | 3         |
| ECT206       | Electronic Devices and Circuits     | 2 | 1 | 0 | 3         |
| PHT203       | Electromagnetic Field & Waves       | 3 | 0 | 0 | 3         |
| EEL201       | Electric Circuit Analysis Lab       | 0 | 0 | 2 | 1         |
| ECL207       | Electronic Devices and Circuits Lab | 0 | 0 | 2 | 1         |
| EEL204       | Python Programming Lab              | 0 | 0 | 2 | 1         |
| <b>Total</b> |                                     |   |   |   | <b>21</b> |



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DEPARTMENT OF ELECTRICAL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

**COURSE STRUCTURE**  
**B.Tech. 4th Semester**

| Course Code  | Course Title                                    | L | T | P | C         |
|--------------|---|---|---|---|-----------|
| EET250       | Electrical Measurements and Instrumentation     | 2 | 1 | 0 | 3         |
| EET251       | Electric Machines II                            | 2 | 1 | 0 | 3         |
| EET252       | Power Systems I                                 | 2 | 1 | 0 | 3         |
| EET253       | Control Systems I                               | 2 | 1 | 0 | 3         |
| ECT251       | Digital Electronics & Logic Design              | 2 | 1 | 0 | 3         |
| HST003       | Basic Management Principles                     | 2 | 1 | 0 | 3         |
| EEL251       | Electric Machines Lab I                         | 0 | 0 | 2 | 1         |
| EEL253       | Control Systems LAB                             | 0 | 0 | 2 | 1         |
| EEL250       | Electrical Measurements and Instrumentation Lab | 0 | 0 | 2 | 1         |
| <b>Total</b> |   |   |   |   | <b>21</b> |



COURSE STRUCTURE  
B.Tech. 5th Semester

| Course Code | Course Title             | L | T | P | C         |
|-------------|--------------------------|---|---|---|-----------|
| ✓ MAT303    | Mathematics IV           | 3 | 0 | 0 | 3         |
| ✓ EET301    | Control Systems II       | 2 | 1 | 0 | 3         |
| ✓ EET302    | Power Systems II         | 2 | 1 | 0 | 3         |
| ✓ EET303    | Power Electronics        | 2 | 1 | 0 | 3         |
| ✓ EET304    | Electric Machines III    | 2 | 1 | 0 | 3         |
| EETOXX      | Program Elective I       | 2 | 1 | 0 | 3         |
| -----*      | Institute Elective I     | 2 | 1 | 0 | 3         |
| ✓ EEL302    | Power Systems Lab I      | 0 | 0 | 2 | 1         |
| ✓ EEL303    | Power Electronics Lab    | 0 | 0 | 2 | 1         |
| ✓ EEL305    | Electric Machines Lab II | 0 | 0 | 2 | 1         |
| Total       |                          |   |   |   | 21-<br>24 |

\* Students must choose 2 Institute elective courses at the 5<sup>th</sup> & 6<sup>th</sup> semester level from any of the 14 Institute elective courses that will be floated by the other 7 engineering departments of the Institute.

\*\* For an honors degree, students must accumulate 180 credits. They must complete all the program electives.

Program Elective I

1. Digital Signal Processing (EET001)
2. Renewable Power Generation (EET002)

SCE  
ID  
MCE  
Gled  
MME  
Chem  
Cm



**COURSE STRUCTURE**  
**B.Tech. 6th Semester**

| Course Code  | Course Title                | L | T | P | C                 |
|--------------|-----------------------------|---|---|---|-------------------|
| EET350       | Power Systems III           | 2 | 1 | 0 | 3                 |
| EET351       | Electric Drives             | 2 | 1 | 0 | 3                 |
| EET352       | Design of Electric Machines | 2 | 1 | 0 | 3                 |
| EET353       | Microprocessors             | 2 | 1 | 0 | 3                 |
| EETOXX       | Program Elective II         | 2 | 1 | 0 | 3                 |
| EETOXX       | Program Elective III        | 2 | 1 | 0 | 3                 |
| -----        | Institute Elective II       | 2 | 1 | 0 | 3                 |
| EEL350       | Power Systems Lab II        | 0 | 0 | 2 | 1                 |
| EEL353       | Microprocessors Lab         | 0 | 0 | 2 | 1                 |
| EES355       | Seminar                     | 0 | 0 | 2 | 1                 |
| EEL356       | Industrial Training & Viva  | 0 | 0 | 0 | 1                 |
| <b>Total</b> |                             |   |   |   | <b>19-<br/>25</b> |

**Program Elective II**

1. Power Station Practice (EET003)
2. Distribution System Automation (EET004)

**Program Elective III**

1. Advanced Control Systems (EET005)
2. Advanced Power Electronics (EET006)



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**COURSE STRUCTURE**  
**B.Tech. 7th Semester**

| Course Code  | Course Title                | L | T | P | C                 |
|--------------|-----------------------------|---|---|---|-------------------|
| EET401       | Power System Protection     | 2 | 1 | 0 | 3                 |
| EETOXX       | Program Elective IV         | 2 | 1 | 0 | 3                 |
| EETOXX       | Program Elective V          | 2 | 1 | 0 | 3                 |
| EETOXX       | Program Elective VI         | 2 | 1 | 0 | 3                 |
| EETOXX       | Program Elective VII        | 2 | 1 | 0 | 3                 |
| EETOXX       | Program Elective VIII       | 2 | 1 | 0 | 3                 |
| HST009       | Personal Financial Planning | 2 | 1 | 0 | 3                 |
| EEL401       | Power System Protection Lab | 0 | 0 | 2 | 1                 |
| EEP402       | Pre-Project                 | 0 | 0 | 4 | 2                 |
| EELOXX       | Program Elective Lab I      | 0 | 0 | 2 | 1                 |
| <b>Total</b> |                             |   |   |   | <b>15-<br/>25</b> |



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**COURSE STRUCTURE**  
**B.Tech. 8th Semester**

| Course Code  | Course Title            | L | T | P  | C                 |
|--------------|-------------------------|---|---|----|-------------------|
| EETOXX       | Program Elective IX     | 2 | 1 | 0  | 3                 |
| EETOXX       | Program Elective X      | 2 | 1 | 0  | 3                 |
| EETOXX       | Program Elective XI     | 2 | 1 | 0  | 3                 |
| EETOXX       | Program Elective XII    | 2 | 1 | 0  | 3                 |
| EETOXX       | Program Elective XIII   | 2 | 1 | 0  | 3                 |
| EEP450       | Project                 | 0 | 0 | 12 | 6                 |
| EELOXX       | Program Elective Lab II | 0 | 0 | 2  | 1                 |
| <b>Total</b> |                         |   |   |    | <b>15-<br/>22</b> |



# CSE

## SCHEME OF COURSES FOR 3<sup>RD</sup> SEMESTER

| S. No.       | Course Code | Course Title                        | Department Offering | Credit    | Contact Hours |   |   |           |
|--------------|-------------|-------------------------------------|---------------------|-----------|---------------|---|---|-----------|
|              |             |                                     |                     |           | L             | T | P | Total     |
| 1            | CST201      | Object Oriented Programming         | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 2            | CSL202      | Object Oriented Programming -Lab    | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 4            | CST203      | Database Management Systems         | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 5            | CSL204      | Database Management Systems - Lab   | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 6            | CST205      | Software Engineering                | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 7            | ECT205      | Electronic Devices and Circuits     | ECE                 | 3         | 2             | 1 | 0 | 3         |
| 8            | ECL206      | Electronic Devices and Circuits Lab | ECE                 | 1         | 0             | 0 | 2 | 2         |
| 9            | MAT207      | Discrete Mathematics                | Mathematics         | 3         | 2             | 1 | 0 | 3         |
| 10           | HST006      | Entrepreneurship Development        | Humanities          | 3         | 3             | 0 | 0 | 3         |
| <b>Total</b> |             |                                     |                     | <b>21</b> |               |   |   | <b>24</b> |

## SCHEME OF COURSES FOR 4<sup>TH</sup> SEMESTER

| S. No.       | Course Code | Course Title                             | Department Offering | Credit    | Contact Hours |   |   |           |
|--------------|-------------|--|---------------------|-----------|---------------|---|---|-----------|
|              |             |  |                     |           | L             | T | P | Total     |
| 1            | CST250      | Data Structures                          | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 2            | CSL251      | Data Structures – Lab                    | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 3            | CST252      | Internet & Web Technologies              | CSE                 | 3         | 1             | 1 | 2 | 4         |
| 4            | CST253      | Theory of Computation                    | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 5            | ECT251      | Digital Electronics & Logic Design       | ECE                 | 3         | 2             | 1 | 0 | 3         |
| 6            | ECL255      | Digital Electronics & Logic Design – Lab | ECE                 | 1         | 0             | 0 | 2 | 2         |
| 7            | MAT217      | Probability & Statistics                 | Mathematics         | 3         | 3             | 0 | 0 | 3         |
| 8            | HST058      | Project Management                       | Humanities          | 3         | 2             | 1 | 0 | 3         |
| <b>Total</b> |             |  |                     | <b>20</b> |               |   |   | <b>23</b> |

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### SCHEME OF COURSES FOR 5<sup>TH</sup> SEMESTER

| S. No. | Course Code | Course Title                    | Department Offering | Credit    | Contact Hours |   |   |           |
|--------|-------------|---------------------------------|---------------------|-----------|---------------|---|---|-----------|
|        |             |                                 |                     |           | L             | T | P | Total     |
| 1      | CST306      | Design & Analysis of Algorithms | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 2      | CST307      | Microprocessor                  | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 3      | CSL308      | Microprocessor - Lab            | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 4      | CST309      | Operating Systems               | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 5      | CST310      | Python Programming              | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 6      | CSL311      | Python Programming - Lab        | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 7      | -           | Open Elective-I                 | -                   | 3         | 3             | 0 | 0 | 3         |
| 9      | ECT307      | Communication Systems           | ECE                 | 3         | 2             | 1 | 0 | 3         |
| 10     | ECL308      | Communication Systems Lab       | ECE                 | 1         | 0             | 0 | 2 | 2         |
|        |             | <b>Total</b>                    |                     | <b>21</b> |               |   |   | <b>24</b> |
| 10     | -           | Honors Elective I               | -                   | 3         | 3             | 0 | 0 | 3         |

### SCHEME OF COURSES FOR 6<sup>TH</sup> SEMESTER

| S. No. | Course Code | Course Title                         | Department Offering | Credit    | Contact Hours |   |   |           |
|--------|-------------|--------------------------------------|---------------------|-----------|---------------|---|---|-----------|
|        |             |                                      |                     |           | L             | T | P | Total     |
| 1      | CST354      | Artificial Intelligence              | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 2      | CSL355      | Artificial Intelligence - Lab        | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 3      | CST356      | Computer Networks                    | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 4      | CSL357      | Computer Networks - Lab              | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 5      | CST358      | Computer Organization & Architecture | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 6      | CST359      | Java Programming                     | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 7      | CSL360      | Java Programming Lab                 | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 8      | -           | Open Elective-II                     | -                   | 3         | 3             | 0 | 0 | 3         |
| 9      | CSI361      | Industrial Training or internship    | CSE                 | 1         | 0             | 0 | 0 | 0         |
| 10     | CST0XX      | Elective-I                           | CSE                 | 3         | 3             | 0 | 0 | 3         |
|        |             | <b>Total</b>                         |                     | <b>22</b> |               |   |   | <b>24</b> |
| 11     | -           | Honors Elective II                   | -                   | 3         | 3             | 0 | 0 | 3         |

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### SCHEME OF COURSES FOR 7<sup>TH</sup> SEMESTER

| S. No. | Course Code | Course Title                | Department Offering | Credit    | Contact Hours |   |   |           |
|--------|-------------|-----------------------------|---------------------|-----------|---------------|---|---|-----------|
|        |             |                             |                     |           | L             | T | P | Total     |
| 1      | CST412      | <del>Network Security</del> | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 2      | CSL413      | Network Security - Lab      | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 3      | CST414      | <del>Compiler Design</del>  | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 4      | CSP415      | <del>Pre-Project</del>      | CSE                 | 2         | 0             | 0 | 4 | 4         |
| 5      | CSS416      | <del>Seminar</del>          | CSE                 | 1         | 0             | 0 | 2 | 2         |
| 6      | CST0XX      | Elective-II                 | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 7      | CST0XX      | Elective-III                | CSE                 | 3         | 2             | 1 | 0 | 3         |
| 8      | CST0XX      | Elective-IV                 | CSE                 | 3         | 2             | 1 | 0 | 3         |
|        |             | <b>Total</b>                |                     | <b>19</b> |               |   |   | <b>23</b> |
| 9      | -           | Honors Elective III         | -                   | 3         | 3             | 0 | 0 | 3         |
| 10     | -           | Honors Elective IV          | -                   | 3         | 3             | 0 | 0 | 3         |

### SCHEME OF COURSES FOR 8<sup>TH</sup> SEMESTER

| S. No. | Course Code | Course Title               | Department Offering | Credit    | Contact Hours |   |   |           |
|--------|-------------|----------------------------|---------------------|-----------|---------------|---|---|-----------|
|        |             |                            |                     |           | L             | T | P | Total     |
| 1      | CST0XX      | Elective V*                | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 2      | CST0XX      | Elective VI*               | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 3      | CST0XX      | Elective VII*              | CSE                 | 3         | 3             | 0 | 0 | 3         |
| 4      | CSP462      | Project                    | CSE                 | 6         | 0             | 0 | 6 | 6         |
|        |             | <b>Total</b>               |                     | <b>15</b> |               |   |   | <b>15</b> |
| 5      | -           | Honors Elective V*         | -                   | 3         | 3             | 0 | 0 | 3         |
| 9      | -           | Honors Elective VI*        | -                   | 3         | 3             | 0 | 0 | 3         |
| 7      | -           | Honors Comprehensive Viva* | -                   | 2         | 2             | 0 | 0 | 2         |

\*Electives can be taken as swayam/self-study/ online/ hybrid courses from the list of Electives, anytime during the final year.

**COURSES OFFERED TO OTHER DEPARTMENTS AS OPEN ELECTIVES FOR 5<sup>TH</sup> SEMESTER**

| S. No. | Course Code   | Course Title                | Credit | Contact Hours |   |   |       |
|--------|---------------|-----------------------------|--------|---------------|---|---|-------|
|        |               |                             |        | L             | T | P | Total |
| 1.     | CST B1<br>901 | Database Management Systems | 3      | 2             | 1 | 0 | 3     |
| 2.     | CST B1<br>902 | Python Programming          | 3      | 2             | 1 | 0 | 3     |

**COURSES OFFERED TO OTHER DEPARTMENTS AS OPEN ELECTIVES FOR 6<sup>TH</sup> SEMESTER**

| S. No. | Course Code   | Course Title            | Credit | Contact Hours |   |   |       |
|--------|---------------|-------------------------|--------|---------------|---|---|-------|
|        |               |                         |        | L             | T | P | Total |
| 1.     | CST B2<br>951 | Data Structures         | 3      | 2             | 1 | 0 | 3     |
| 2.     | CST B2<br>952 | Artificial Intelligence | 3      | 2             | 1 | 0 | 3     |

## LIST OF ELECTIVES

| S.No. | Subject                             | Code   | L-T-P-Credits |
|-------|-------------------------------------|--------|---------------|
| 1.    | Simulation & Modeling               | CST001 | 3-0-0-3       |
| 2.    | Graph Theory                        | CST002 | 3-0-0-3       |
| 3.    | Digital Signal Processing           | CST003 | 3-0-0-3       |
| 4.    | Multimedia Technology               | CST004 | 3-0-0-3       |
| 5.    | Logic Programming                   | CST005 | 3-0-0-3       |
| 6.    | Embedded Systems                    | CST006 | 3-0-0-3       |
| 7.    | Advanced Java & Android Programming | CST007 | 3-0-0-3       |
| 8.    | System on Chip (SoC)                | CST008 | 3-0-0-3       |
| 9.    | Advanced Internet Technologies      | CST009 | 3-0-0-3       |
| 10.   | Wireless Communication              | CST010 | 3-0-0-3       |
| 11.   | Fault Tolerant Computing            | CST011 | 3-0-0-3       |
| 12.   | Image Processing                    | CST012 | 3-0-0-3       |
| 13.   | System Design using HDL             | CST013 | 3-0-0-3       |
| 14.   | Real Time Systems                   | CST014 | 3-0-0-3       |
| 15.   | Unix & Shell Programming            | CST015 | 3-0-0-3       |
| 16.   | High Speed Networks                 | CST016 | 3-0-0-3       |
| 17.   | Advanced Algorithms                 | CST017 | 3-0-0-3       |
| 18.   | Reconfigurable Computing            | CST018 | 3-0-0-3       |
| 19.   | Computer Vision                     | CST019 | 3-0-0-3       |
| 20.   | Advanced Computer Networks          | CST020 | 3-0-0-3       |
| 21.   | Advanced Computer Graphics          | CST021 | 3-0-0-3       |
| 22.   | Advanced DBMS                       | CST022 | 3-0-0-3       |
| 23.   | Advanced Computer Architecture      | CST023 | 3-0-0-3       |
| 24.   | Advanced Compilation Techniques     | CST024 | 3-0-0-3       |
| 25.   | Principles of Cryptography          | CST025 | 3-0-0-3       |
| 26.   | Neural Networks                     | CST026 | 3-0-0-3       |
| 27.   | Pervasive Computing                 | CST027 | 3-0-0-3       |
| 28.   | Distributed and Parallel Computing  | CST028 | 3-0-0-3       |
| 29.   | Cloud Computing                     | CST029 | 3-0-0-3       |
| 30.   | Software Project Management         | CST030 | 3-0-0-3       |
| 31.   | Big Data                            | CST031 | 3-0-0-3       |
| 32.   | Cyber laws and Forensics            | CST032 | 3-0-0-3       |
| 33.   | Expert Systems                      | CST033 | 3-0-0-3       |
| 34.   | Mobile Computing                    | CST034 | 3-0-0-3       |
| 35.   | Green Computing                     | CST035 | 3-0-0-3       |
| 36.   | Introduction to Robotics            | CST036 | 3-0-0-3       |
| 37.   | Data Analytics                      | CST037 | 3-0-0-3       |
| 38.   | Computational Biology               | CST038 | 3-0-0-3       |

|                           |  |  |                              |                 |    |
|---------------------------|--|--|------------------------------|-----------------|----|
| 1                         | Humanities, Social Science and Management              | Basic English and Communication Skills (3)                           |                              | First           | 13 |
|                           |  | English Language Laboratory (1)                                      |                              | First           |    |
|                           |  | Advanced English Communication Skills & Organisational Behaviour (3) |                              | 2 <sup>nd</sup> |    |
|                           |  | Entrepreneurship Development (3)                                     |                              | 3 <sup>rd</sup> |    |
|                           |  | Project Management (3)   |                              | 4 <sup>th</sup> |    |
| 2                         | Basic Science Courses including Mathematics            | Mathematics (12)   | Mathematics-I (3)            | First           | 23 |
|                           |  |  | Mathematics-II (3)           | 2 <sup>nd</sup> |    |
|                           |  |  | Discrete Mathematics (3)     | 3 <sup>rd</sup> |    |
|                           |  |  | Probability & Statistics (3) | 4 <sup>th</sup> |    |
|                           |  | Engineering Chemistry (3)  |                              | 2 <sup>nd</sup> |    |
|                           |  | Chemistry Laboratory (1)   |                              |                 |    |
|                           |  | Engineering Physics (3)  |                              | First           |    |
|                           |  | Engineering & Applied Physics Laboratory (1)                         |                              |                 |    |
| Environmental Studies (3) |  | First  |                              |                 |    |
| 3                         | Basic Engineering Courses                              | Engineering Drawing (3)  |                              | 2 <sup>nd</sup> | 18 |
|                           |  | Elements of Mechanical Engineering (3)                               |                              | First           |    |
|                           |  | Basic Electrical Engineering (3)                                     |                              | 2 <sup>nd</sup> |    |
|                           |  | Engineering Mechanics (3)  |                              | First           |    |
|                           |  | Workshop Practice (2)  |                              | First           |    |
|                           |  | Computer Programming (3)   |                              | 2 <sup>nd</sup> |    |
|                           |  | Computer Programming Laboratory (1)                                  |                              | 2 <sup>nd</sup> |    |
| 4                         | Institute Open Electives (Compulsory for all students) | Open Elective-I (3)  |                              | 5 <sup>th</sup> | 6  |
|                           |  | Open Elective-II (3)   |                              | 6 <sup>th</sup> |    |
| 5                         | Professional Electives relevant to branch              | Elective-I   |                              | 6 <sup>th</sup> | 21 |
|                           |  | Elective-II  |                              | 7 <sup>th</sup> |    |
|                           |  | Elective-III   |                              | 7 <sup>th</sup> |    |
|                           |  | Elective-IV  |                              | 7 <sup>th</sup> |    |
|                           |  | Elective-V   |                              | 8 <sup>th</sup> |    |
|                           |  | Elective-VI  |                              | 8 <sup>th</sup> |    |
|                           |  | Elective-VII   |                              | 8 <sup>th</sup> |    |
| 6                         | Professional core courses relevant to branch (63-69)   | Object Oriented Programming (3)                                      |                              | 3 <sup>rd</sup> | 69 |
|                           |  | Electronic Devices and Circuits (3)                                  |                              | 3 <sup>rd</sup> |    |
|                           |  | Database Management Systems (3)                                      |                              | 3 <sup>rd</sup> |    |
|                           |  | Software Engineering (3)   |                              | 3 <sup>rd</sup> |    |
|                           |  | Internet & Web Technologies (3)                                      |                              | 4 <sup>th</sup> |    |
|                           |  | Data Structures (3)  |                              | 4 <sup>th</sup> |    |
|                           |  | Digital Electronics and Logic Design (3)                             |                              | 4 <sup>th</sup> |    |

|                        |  |   |                 |    |
|------------------------|--|---|-----------------|----|
|                        |  | Theory of Computation (3)   | 4 <sup>th</sup> |    |
|                        |  | Compiler Design (3)   | 7 <sup>th</sup> |    |
|                        |  | Design Analysis and Algorithms (3)                                      | 5 <sup>th</sup> |    |
|                        |  | Microprocessor (3)  | 5 <sup>th</sup> |    |
|                        |  | Operating Systems (3)   | 5 <sup>th</sup> |    |
|                        |  | Communication Systems (3)   | 4 <sup>th</sup> |    |
|                        |  | Python Programming (3)  | 5 <sup>th</sup> |    |
|                        |  | Artificial Intelligence (3)   | 6 <sup>th</sup> |    |
|                        |  | Computer Networks (3)   | 6 <sup>th</sup> |    |
|                        |  | Computer Organization and Architecture (3)                              | 6 <sup>th</sup> |    |
|                        |  | Java Programming (3)  | 6 <sup>th</sup> |    |
|                        |  | Network Security (3)  | 7 <sup>th</sup> |    |
|                        |  | Object Oriented Programming Lab (1)                                     | 3 <sup>rd</sup> |    |
|                        |  | Electronic Devices and Circuits Lab (1)                                 | 3 <sup>rd</sup> |    |
|                        |  | Database Management Systems Lab (1)                                     | 3 <sup>rd</sup> |    |
|                        |  | Data Structures Lab (1)   | 4 <sup>th</sup> |    |
|                        |  | Digital Electronics and Logic Design Lab (1)                            | 4 <sup>th</sup> |    |
|                        |  | Communication Systems Lab (1)   | 5 <sup>th</sup> |    |
|                        |  | Microprocessor Lab (1)  | 5 <sup>th</sup> |    |
|                        |  | Python Programming Lab (1)  | 5 <sup>th</sup> |    |
|                        |  | Artificial Intelligence Lab (1)   | 6 <sup>th</sup> |    |
|                        |  | Computer Networks Lab (1)   | 6 <sup>th</sup> |    |
|                        |  | Java Programming Lab (1)  | 6 <sup>th</sup> |    |
|                        |  | Network Security Lab (1)  | 7 <sup>th</sup> |    |
| 7                      | Project (8 <sup>th</sup> semester)<br>Pre-project (7 <sup>th</sup> semester)<br>Seminar (6 <sup>th</sup> semester)<br>Compulsory industrial training/<br>internship 8 weeks to be done after 5 <sup>th</sup> semester (6 <sup>th</sup> semester) | Project (06)  | 8 <sup>th</sup> | 10 |
|                        |  | Pre-Project (2)   | 7 <sup>th</sup> |    |
|                        |  | Seminar (1)   | 7 <sup>th</sup> |    |
|                        |  | Industrial Training or internship (1)                                   | 6 <sup>th</sup> |    |
| Total Credits          |  |   | 160             |    |
| Total Minimum Required |  | B.Tech. Requirements = 160 credits<br>B.Tech. with Honors = 180 credits |                 |    |

### REQUIRED CREDIT BREAKUP

| S. No.        | Category  | Credits   |         | Courses/ Subjects  |
|---------------|---|---|---------|--|
|               |   | Minimum   | Maximum |  |
| 1             | Humanities, Social Science and Management courses   | 13  |         | Theory = 04<br>Lab = .01   |
| 2             | Basic Science Courses including Mathematics   | 23  | 29      | Maths Theory = 4-6<br>Chemistry : T=2, L=01<br>Physics: T=01, L=01 |
|               |   | Mathematics. 12 – 18<br>Chemistry. 4<br>Physics. 4<br>Environmental Studies. 3  |         |  |
| 3             | Basic Engineering Courses   | 18  |         | Theory =05<br>Workshop =01<br>Lab =01                              |
|               |   | Engineering Drawing. 3<br>Elements of Mechanical Engineering. 3<br>Basic Electrical Engineering 3<br>Engineering Mechanics 3<br>Workshop Practice 2<br>Computer Programming 4 (3+1) |         |  |
| 4             | Institute Open Electives (Compulsory for all students)  | 06  |         | Theory = 02  |
| 5             | Professional Electives relevant to branch   | 21  | 45      | Theory = 07-15   |
| 6             | Professional core courses relevant to branch  | 63  | 69      | Theory = 17-19;<br>Lab = 9-12                                      |
| 7             | Project (8 <sup>th</sup> semester)<br>Pre-project (7 <sup>th</sup> semester)<br>Seminar (6 <sup>th</sup> semester)<br>Compulsory industrial training/ internship 8 weeks to be done after 5 <sup>th</sup> semester (6 <sup>th</sup> semester) | Project. = 06<br>Pre-Project = 02<br>Seminar = 01<br>Industrial Training or internship = 01<br>Sub-total of credits = 10  |         | 4  |
| Total Minimum |   | B.Tech. Requirements = 160 credits<br>B.Tech. with Honors = 180 credits   |         |  |

### CREDIT BREAKUP FOR CSE

| S. No. | Category | Course Name (Credits) | Semester | Credits Covered |
|--------|----------|-----------------------|----------|-----------------|
|--------|----------|-----------------------|----------|-----------------|

|     |                                    |        |         |
|-----|------------------------------------|--------|---------|
| 39. | Special topics in Computer Science | CST039 | 3-0-0-3 |
| 40. | System & Network Administration    | CST040 | 3-0-0-3 |
| 41. | Pattern Recognition                | CST041 | 3-0-0-3 |
| 42. | Natural Language Processing        | CST042 | 3-0-0-3 |
| 43. | Quantum Computing                  | CST043 | 3-0-0-3 |
| 44. | Deep Learning                      | CST044 | 3-0-0-3 |
| 45. | Introduction to Data Science       | CST045 | 3-0-0-3 |
| 46. | Internet of Things                 | CST046 | 3-0-0-3 |
| 47. | Advanced Cryptography              | CST047 | 3-0-0-3 |
| 48. | Data Mining                        | CST048 | 3-0-0-3 |
| 49. | Advanced Graph Algorithms          | CST049 | 3-0-0-3 |
| 50. | Advanced Java                      | CST050 | 3-0-0-3 |
| 51. | Machine Learning                   | CST051 | 3-0-0-3 |
| 52. | Computer Graphics                  | CST052 | 3-0-0-3 |
| 53. | Advanced Data Structures           | CST053 | 3-0-0-3 |
| 54. | Numerical Methods                  | MTH707 | 3-0-0-3 |
| 55. | Operations Research                | MAT-02 | 3-0-0-3 |
| 56. | Signals and Systems                | ECTXXX | 3-0-0-3 |
| 57. | Control Systems                    | EETXXX | 3-0-0-3 |

Done

IT

IT Done

Information and Technology Department: Implemented from Batch 2023 Total Required Credits: Minimum = 160 (1<sup>st</sup> + 2<sup>nd</sup> Semester = 42)

| Semester | Course-1                          | Course-2                     | Course-3                             | Course-4                           | Course-5                                   | Course-6                  | Course-7                                 | Course-8                        | Course-9                             | Course-10        | Course-11 | Total Credits |
|----------|-----------------------------------|------------------------------|--------------------------------------|------------------------------------|--|---------------------------|--|---------------------------------|--------------------------------------|------------------|-----------|---------------|
| III      | Data Structures                   | Control System               | Logic and Graphic Theory             | Object Oriented Programming        | Electronic Devices and Circuits            | Discrete Mathematics      | Data Structures Lab                      | Object-Oriented Programming Lab | Electronics Devices and Circuits Lab | Web Programming* |           |               |
|          | 3                                 | 3                            | 3                                    | 3                                  | 3  | 3                         | 1  | 1                               | 1                                    | 2                |           | 23            |
|          | ITT201                            | EET254                       | ITT202                               | ITT203                             | ECT206                                     | MAT208                    | ITL201                                   | ITL203                          | ECL207                               | ITL204           |           |               |
| IV       | Operating Systems                 | Software Engineering         | Digital Electronics and Logic Design | Database Management System         | Introduction to Probability and Statistics | Signal and Systems        | Digital Electronics and Logic Design Lab | Operating System Lab            | Database Management System Lab       |                  |           |               |
|          | 3                                 | 3                            | 3                                    | 3                                  | 3  | 3                         | 1  | 1                               | 1                                    |                  |           | 21            |
|          | ITT251                            | ITT252                       | ECT251                               | ITT253                             | MAT218                                     | ECT257                    | ECL255                                   | ITL251                          | ITL253                               |                  |           |               |
| V        | Design and Analysis of Algorithms | Artificial Intelligence      | Computer Organization & Architecture | Theory of Computation              | Elective I                                 | Institute Open Elective I | Design & Analysis of Algorithms Lab      | Artificial Intelligence Lab     |                                      |                  |           |               |
|          | 3                                 | 3                            | 3                                    | 3                                  | 3  | 3                         | 1  | 1                               |                                      |                  |           | 20            |
|          | ITT301                            | ITT302                       | ITT303                               | ITT304                             | ITT0XX                                     | OPEN                      | ITL301                                   | ITL302                          |                                      |                  |           |               |
| VI       | Computer Networks                 | Machine Learning             | Big Data                             | Elective II                        | Institute Open Elective II                 | Computer Networks Lab     | Machine Learning Lab                     | Seminar                         | Industrial Training and Internship   | Elective III     |           |               |
|          | 3                                 | 3                            | 3                                    | 3                                  | 3  | 1                         | 1  | 1                               | 1                                    | 1                |           | 20            |
|          | ITT351                            | ITT352                       | ITT353                               | ITT0XX                             | OPEN                                       | ITL351                    | ITL352                                   | ITL354                          | ITL355                               | ITL0XX           |           |               |
| VII      | Image Processing                  | Entrepreneurship Development | Elective IV                          | Elective V                         | Elective VI                                | Image Processing Lab      | Elective VII                             | Pre-Project                     |                                      |                  |           |               |
|          | 3                                 | 3                            | 3                                    | 3                                  | 3  | 1                         | 1  | 2                               |                                      |                  |           | 19            |
|          | ITT401                            | HST006                       | ITT0XX                               | ITT0XX                             | ITT0XX                                     | ITL401                    | ITL0XX                                   | ITP402                          |                                      |                  |           |               |
| VIII     | Project                           | Elective VIII                | Elective IX                          | Engineering Economics & Management |  |                           |  |                                 |                                      |                  |           |               |
|          | 6                                 | 3                            | 3                                    | 3                                  |  |                           |  |                                 |                                      |                  |           | 15            |
|          | ITP451                            | ITT0XX                       | ITT0XX                               | HST004                             |  |                           |  |                                 |                                      |                  |           |               |
|          |                                   |                              |                                      |                                    |  |                           |  |                                 |                                      |                  |           | 160           |

82.00  
 75  
 314  
 180  
 380

# CIVIL

DEPARTMENT OF CIVIL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR J & K

## PROPOSED SCHEME OF COURSES FOR 3<sup>RD</sup> SEMESTER – 2023 ONWARDS

| S. No.       | Course Code | Course Title                                    | Department Offering | Credit    | Contact Hours |          |          |           |
|--------------|-------------|---|---------------------|-----------|---------------|----------|----------|-----------|
|              |             |   |                     |           | L             | T        | P        | Total     |
| 1            | CVT201      | Structural Analysis-I ✓                         | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 2            | CVL201      | Structural Analysis Lab ✓                       | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 3            | CVT202      | Fluid Mechanics ✓                               | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 4            | CVL202      | Fluid Mechanics Lab-I                           | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 5            | CVT203      | Surveying-I ✓                                   | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 6            | CVL203      | Surveying Lab-I                                 | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 7            | MAT201      | Mathematics-III ✓                               | Mathematics         | 3         | 2             | 1        | 0        | 3         |
| 8            | CVT204      | Building Materials and Construction ✓           | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 9            | HST202      | Basics of Industrial Economics and Management ✓ | Humanities          | 3         | 2             | 1        | 0        | 3         |
| <b>Total</b> |             |   |                     | <b>21</b> | <b>12</b>     | <b>6</b> | <b>6</b> | <b>24</b> |

## PROPOSED SCHEME OF COURSES FOR 4<sup>TH</sup> SEMESTER – 2023 ONWARDS

| S. No.       | Course Code | Course Title                     | Department Offering | Credit    | Contact Hours |          |           |           |
|--------------|-------------|----------------------------------|---------------------|-----------|---------------|----------|-----------|-----------|
|              |             |                                  |                     |           | L             | T        | P         | Total     |
| 1            | CVT251      | Structural Analysis-II           | Civil Engg.         | 3         | 2             | 1        | 0         | 3         |
| 2            | CVT252      | Fluid Flow in Pipes and Channels | Civil Engg.         | 3         | 2             | 1        | 0         | 3         |
| 3            | CVL252      | Fluid Mechanics Lab-II           | Civil Engg.         | 1         | 0             | 0        | 2         | 2         |
| 4            | CVT253      | Surveying-II                     | Civil Engg.         | 3         | 2             | 1        | 0         | 3         |
| 5            | CVL253      | Surveying Lab-II                 | Civil Engg.         | 1         | 0             | 0        | 2         | 2         |
| 6            | CVT254      | Engineering Geology              | Civil Engg.         | 3         | 2             | 1        | 0         | 3         |
| 7            | CVL254      | Geology Lab                      | Civil Engg.         | 1         | 0             | 0        | 2         | 2         |
| 8            | CVT255      | Civil Engineering Drawing        | Civil Engg.         | 3         | 1             | 0        | 4         | 5         |
| 9            | CVL255      | Survey Camp                      | Civil Engg.         | 2         | 0             | 0        | 4         | 4         |
| 10           | MAT256      | Mathematics-IV                   | Mathematics         | 3         | 2             | 1        | 0         | 3         |
| <b>Total</b> |             |                                  |                     | <b>23</b> | <b>11</b>     | <b>5</b> | <b>14</b> | <b>30</b> |

\*2-Weeks Survey camp

DEPARTMENT OF CIVIL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR J & K

**PROPOSED SCHEME OF COURSES FOR 5<sup>TH</sup> SEMESTER – 2023 ONWARDS**

| S. No. | Course Code       | Course Title   | Department Offering | Credit    | Contact Hours |          |          |           |
|--------|-------------------|--|---------------------|-----------|---------------|----------|----------|-----------|
|        |                   |  |                     |           | L             | T        | P        | Total     |
| 1      | CVT301            | Design of Reinforced Concrete Structures-I                             | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 2      | CVL301            | Concrete Lab   | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 3      | CVT302            | Highway Engineering  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 4      | CVL302            | Highway Engineering Lab  | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 5      | CVT303            | Geotechnical Engineering-I   | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 6      | CVL303            | Geotechnical Lab-I   | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 7      | CVT304            | Water Resources Engineering  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 8      | CVT305            | Quantity Surveying and Cost Evaluation                                 | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 9      | HST301            | Philosophy for Engineers: Society, Culture and Ethics                  | Humanities          | 3         | 2             | 1        | 0        | 3         |
|        |                   | <b>Total</b>   |                     | <b>21</b> | <b>12</b>     | <b>6</b> | <b>6</b> | <b>24</b> |
| 10     | CVT306-<br>CVT308 | <i>Honors Elective-I</i>   | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 11     | CVT B1<br>901     | Quantity Surveying and Cost Evaluation ( <i>Institute Elective-I</i> ) | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 12     | CVT B2<br>902     | Building Materials and Construction ( <i>Institute Elective-II</i> )   | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |

DEPARTMENT OF CIVIL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR J & K

**PROPOSED SCHEME OF COURSES FOR 6<sup>TH</sup> SEMESTER – 2023 ONWARDS**

| S. No. | Course Code       | Course Title   | Department Offering | Credit    | Contact Hours |          |          |           |
|--------|-------------------|--|---------------------|-----------|---------------|----------|----------|-----------|
|        |                   |  |                     |           | L             | T        | P        | Total     |
| 1      | CVT351            | Design of Steel Structures                                 | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 2      | CVT352            | Traffic Engineering  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 3      | CVL352            | Traffic Engineering Lab.                                   | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 4      | CVT353            | Geotechnical Engineering-II                                | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 5      | CVL353            | Geotechnical Lab-II  | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 6      | CVT354            | Environmental Engineering-I                                | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 7      | CVL354            | Water Quality Lab  | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 8      | CVT3501           | Industrial Training and Presentation                       | Civil Engg.         | 1         | 0             | 0        | 0        | 0         |
| 9      | CVT355-<br>CVT358 | Elective-I   | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 10     | CVT359-<br>CVT362 | Elective-II  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
|        |                   | <b>Total</b>   |                     | <b>22</b> | <b>12</b>     | <b>6</b> | <b>6</b> | <b>24</b> |
| 11     | CVT363-<br>CVT365 | <i>Honors Elective-II</i>                                  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 12     | CVT B1<br>951     | Environmental Engineering ( <i>Institute Elective-I</i> )  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 13     | CVT B2<br>952     | Civil Engineering Drawing ( <i>Institute Elective-II</i> ) | Civil Engg.         | 3         | 1             | 0        | 4        | 3         |

DEPARTMENT OF CIVIL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR J & K

**PROPOSED SCHEME OF COURSES FOR 7<sup>TH</sup> SEMESTER – 2023 ONWARDS**

| S. No. | Course Code   | Course Title               | Department Offering | Credit    | Contact Hours |          |          |           |
|--------|---------------|----------------------------|---------------------|-----------|---------------|----------|----------|-----------|
|        |               |                            |                     |           | L             | T        | P        | Total     |
| 1      | CVT401-CVT403 | Elective-III               | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 2      | CVT404-CVT406 | Elective-IV                | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 3      | CVT407-CVT409 | Elective-V                 | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 4      | CVT410-CVT412 | Elective-VI                | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 5      | CVS4001       | Seminar                    | Civil Engg.         | 1         | 0             | 0        | 2        | 2         |
| 6      | CVL4002       | Pre-Project work           | Civil Engg.         | 2         | 0             | 0        | 4        | 4         |
|        |               | <b>Total</b>               |                     | <b>15</b> | <b>8</b>      | <b>4</b> | <b>6</b> | <b>18</b> |
| 7      | CVT413-CVT415 | <i>Honors Elective-III</i> | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 8      | CVT416-CVT418 | <i>Honors Elective-IV</i>  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 9      | CVT419-CVT421 | <i>Honors Elective-V</i>   | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |

**PROPOSED SCHEME OF COURSES FOR 8<sup>TH</sup> SEMESTER – 2023 ONWARDS**

| S. No. | Course Code   | Course Title               | Department Offering | Credit    | Contact Hours |          |          |           |
|--------|---------------|----------------------------|---------------------|-----------|---------------|----------|----------|-----------|
|        |               |                            |                     |           | L             | T        | P        | Total     |
| 1      | CVT451-CVT454 | Elective-VII               | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 2      | CVT455-CVT458 | Elective-VIII              | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 3      | CVT459-CVT462 | Elective-IX                | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 4      | CVL4501       | Project                    | Civil Engg.         | 6         | 0             | 3        | 6        | 9         |
| 5      | CVV4502       | Professional Viva          | Civil Engg.         | 1         | -             | -        | -        | -         |
|        |               | <b>Total</b>               |                     | <b>16</b> | <b>6</b>      | <b>6</b> | <b>6</b> | <b>18</b> |
| 6      | CVT463-CVT466 | <i>Honors Elective-VI</i>  | Civil Engg.         | 3         | 2             | 1        | 0        | 3         |
| 7      | CVT467-CVT470 | <i>Honors Elective-VII</i> | Civil Engg.         | 2         | 2             | 0        | 0        | 2         |

**Important Notes:**

1. There are nine professional electives in the scheme and a student has to choose any seven elective courses from these. However, a student has the choice of taking two online courses of a minimum of 3 credits each from SWAYAM and/or NPTEL platforms from the list of online courses approved by the department.
2. The student has to take two open electives courses of 3 credits each as Institute-open electives from any department other than the parent department of the student.
3. A student has to earn a minimum of 160 credits for the award of B.Tech. Degree in Civil Engineering and a minimum of 180 credits for B. Tech. Degree with Honors in Civil Engineering.

**LIST OF ELECTIVE COURSES**

**6<sup>TH</sup> SEMESTER**

**ELECTIVE-I**

|        |  |
|--------|--|
| CVT355 | Structural Analysis-III                |
| CVT356 | Watershed Management                   |
| CVT357 | Railway and Airport Engineering        |
| CVT358 | Construction Technology and Management |

**ELECTIVE-II**

|        |   |
|--------|---|
| CVT359 | Concrete Technology                         |
| CVT360 | Building Information Modelling              |
| CVT361 | Rock Mechanics and Tunnelling Technology    |
| CVT362 | Photogrammetry and Digital Image Processing |

**7<sup>TH</sup> SEMESTER**

**ELECTIVE-III**

|        |   |
|--------|---|
| CVT401 | Dynamics of Structures                      |
| CVT402 | Design of Reinforced Concrete Structures-II |
| CVT403 | Matrix Structural Analysis                  |

**ELECTIVE-IV**

|        |                                     |
|--------|-------------------------------------|
| CVT404 | Irrigation and Hydraulic Structures |
| CVT405 | Applied Hydrology                   |
| CVT406 | Fluvial Hydraulics                  |

**ELECTIVE-V**

|        |                                 |
|--------|---------------------------------|
| CVT407 | Ground Improvement Techniques   |
| CVT408 | Earth Retaining Structures      |
| CVT409 | Geotechnical Field Measurements |

**ELECTIVE-VI**

|        |                                     |
|--------|-------------------------------------|
| CVT410 | Intelligent Transportation Systems  |
| CVT411 | Pavement Evaluation and Maintenance |
| CVT412 | Road Safety Analysis and Audit      |

**8<sup>TH</sup> SEMESTER**

**ELECTIVE-VII**

|        |   |
|--------|---|
| CVT451 | Earthquake Resistant Design                 |
| CVT452 | Bridge Engineering                          |
| CVT453 | Design of Prestressed Concrete Structures   |
| CVT454 | Instrumentation in Geotechnical Engineering |

**ELECTIVE-VIII**

|        |   |
|--------|---|
| CVT455 | Hydropower Engineering                                    |
| CVT456 | Environmental Engineering-II                              |
| CVT457 | Fundamentals of GIS and Remote Sensing                    |
| CVT458 | Risk and Reliability Analysis in Geotechnical Engineering |

**ELECTIVE-IX**

|        |                                 |
|--------|---------------------------------|
| CVT459 | Foundation Analysis             |
| CVT460 | Disaster Management             |
| CVT461 | Construction Safety Management. |
| CVT462 | Pavement Analysis and Design    |

**LIST OF HONORS ELECTIVE COURSES**

**5<sup>TH</sup> SEMESTER**

**HONORS ELECTIVE-I**

|        |  |
|--------|--|
| CVT306 | Engineering Seismology                 |
| CVT307 | Numerical Methods in Civil Engineering |
| CVT308 | Hydrometeorology                       |

**6<sup>TH</sup> SEMESTER**

**HONORS ELECTIVE-II**

|        |                                   |
|--------|-----------------------------------|
| CVT363 | Architecture and Town Planning    |
| CVT364 | Solid Waste Management            |
| CVT365 | Resource Planning in Construction |

**7<sup>TH</sup> SEMESTER**

**HONORS ELECTIVE-III**

|        |                                    |
|--------|------------------------------------|
| CVT413 | Durability of Concrete Structures  |
| CVT414 | Urban Hydrology                    |
| CVT415 | Geosynthetics in Civil Engineering |

**HONORS ELECTIVE-IV**

|        |                              |
|--------|------------------------------|
| CVT416 | Soil Dynamics                |
| CVT417 | Design of Special Structures |
| CVT418 | Offshore Renewable Energy    |

**HONORS ELECTIVE-V**

|        |   |
|--------|---|
| CVT419 | Finite Element Methods in Civil Engineering |
| CVT420 | Advanced Steel Design                       |
| CVT421 | Construction Laws and Claims                |

**8<sup>TH</sup> SEMESTER**

**HONORS ELECTIVE-VI**

|        |                              |
|--------|------------------------------|
| CVT463 | Hazardous Waste Management   |
| CVT464 | Design of Masonry Structures |
| CVT465 | Design of Traffic Facilities |
| CVT466 | Traffic Flow Theories        |

**HONORS ELECTIVE-VII**

|        |  |
|--------|--|
| CVT467 | Landfill Engineering                         |
| CVT468 | Pre-Engineered and Pre-Fabricated Structures |
| CVT469 | Transport Economics and Evaluation           |
| CVT470 | Uncertainty Analysis in Engineering          |

DEPARTMENT OF CIVIL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR J & K

**REQUIRED CREDIT BREAKUP**

| S. No.               | Category  | Credits   |         | Courses/ Subjects   |
|----------------------|---|---|---------|---|
|                      |   | Minimum   | Maximum |   |
| 1                    | Humanities, Social Science and Management courses   | 13  |         | Theory = 04<br>Lab. = 01  |
| 2                    | Basic Science Courses including Mathematics   | 23  | 29      | Maths Theory = 4-6<br>Chemistry Theory = 2,<br>Lab. = 01<br>Physics Theory = 01,<br>Lab. = 01 |
|                      |   | Mathematics = 12 – 18<br>Chemistry = 4<br>Physics = 4<br>Environmental Studies. 3   |         |   |
| 3                    | Basic Engineering Courses   | 18  |         | Theory =05<br>Workshop =01<br>Lab. =01  |
|                      |   | Engineering Drawing = 3<br>Elements of Mechanical Engineering = 3<br>Basic Electrical Engg. = 3<br>Engineering Mechanics = 3<br>Workshop Practice = 2<br>Computer Programming = 4 (3+1) |         |   |
| 4                    | Institute Open Electives (Compulsory for all students)  | 06  |         | Theory = 02   |
| 5                    | Professional Electives relevant to the branch   | 21  | 45      | Theory = 07-15  |
| 6                    | Professional core courses relevant to the branch  | 63  | 69      | Theory = 17-19,<br>Lab = 9-12   |
| 7                    | Project (8 <sup>th</sup> semester)<br>Pre-project (7 <sup>th</sup> semester)<br>Seminar (6 <sup>th</sup> semester)<br>Compulsory industrial training/ internship 8 weeks to be done after 5 <sup>th</sup> semester (6 <sup>th</sup> semester) | Project. = 06<br>Pre-Project = 02<br>Seminar = 01<br>Industrial Training or Internship = 01<br>Sub-total of credits = 10  |         | 4   |
| <b>Total Minimum</b> |   | <b>B.Tech. Requirements = 160 credits</b><br><b>B.Tech. with Honors = 180 credits</b>   |         |   |