# Scheme & Syllabus of Teaching & Examination for I year B. Tech.
## I Semester Effective from the session: 2017-18

<table>
<thead>
<tr>
<th>S.N</th>
<th>Subject Code</th>
<th>Subject</th>
<th>Theory Papers</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>IA</th>
<th>External</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>MA-101</td>
<td>Engineering Mathematics-I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>20</td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>HU-101/HU-103</td>
<td>Communication Skills / Human Values</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>PY-101/CY-101</td>
<td>Engineering Physics/Engineering Chemistry</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>20</td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>CS-101</td>
<td>Computer Programming-I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>CE-101</td>
<td>Environmental Engineering and Disaster Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>15</td>
<td>2</td>
<td>0</td>
<td>100</td>
<td>400</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

### Practical

<table>
<thead>
<tr>
<th>S.N</th>
<th>Subject Code</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>IA</th>
<th>External</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>HU-102/HU-104</td>
<td>Communication Skills Lab./Human Values: Activities</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>45</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td>7.</td>
<td>PY-102/CY-102</td>
<td>Engineering Physics Lab/Engineering Chemistry Lab</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>45</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td>8.</td>
<td>CS-102</td>
<td>Computer Programming-I Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>60</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>9.</td>
<td>CE-102</td>
<td>Computer Aided Engineering Graphics</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>60</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>10.</td>
<td>ME-101</td>
<td>Mechanical Workshop Practice</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>60</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td>Discipline &amp; Extra Curricular Activity</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>320</td>
<td>180</td>
<td>500</td>
</tr>
</tbody>
</table>

**Grand Total** | 15 | 2 | 11 | 420 | 580 | 1000 |

(Total 28 periods per week)

**L** = Lecture, **T** = Tutorial, **P** = Practical, **IA**=Internal Assessment
## Scheme & Syllabus of Teaching & Examination for I year B. Tech. II Semester Effective from the session: 2017-18

<table>
<thead>
<tr>
<th>S.N</th>
<th>Subject Code</th>
<th>Subject Title</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory Papers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MA-102</td>
<td>Engineering Mathematics-II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>20 80 100</td>
</tr>
<tr>
<td>2.</td>
<td>HU-103/ HU-101/</td>
<td>Human Values/ Communication Skills</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20 80 100</td>
</tr>
<tr>
<td>3.</td>
<td>CY-101/ PY-101</td>
<td>Engineering Chemistry/ Engineering Physics</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>20 80 100</td>
</tr>
<tr>
<td>4.</td>
<td>CS-103</td>
<td>Computer Programming-II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20 80 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Elective (any two)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>EE-101</td>
<td>Basic Electrical and Electronics Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20 80 100</td>
</tr>
<tr>
<td>6.</td>
<td>CE-103</td>
<td>Basic Civil Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20 80 100</td>
</tr>
<tr>
<td>7.</td>
<td>ME-102</td>
<td>Basic Mechanical Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>20 80 100</td>
</tr>
<tr>
<td>8.</td>
<td>OE-101</td>
<td>Engineering Mechanics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>18</td>
<td>2</td>
<td>0</td>
<td>120 480 600</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>HU-104/ HU-102</td>
<td>Human Values: Activities Communication Skills Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>45 30 75</td>
</tr>
<tr>
<td>10.</td>
<td>CY-102/ PY-102</td>
<td>Engineering Chemistry Lab/ Engineering Physics Lab</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>45 30 75</td>
</tr>
<tr>
<td>11.</td>
<td>CS-104</td>
<td>Computer Programming-II Lab</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>60 40 100</td>
</tr>
<tr>
<td>12.</td>
<td>ME-104</td>
<td>Computer Aided Machine Drawing</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>60 40 100</td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td>Discipline &amp; Extra Curricular Activity</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>50 0 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>260 140 400</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Grand Total</strong></td>
<td>18</td>
<td>2</td>
<td>9</td>
<td>380 620 1000</td>
</tr>
</tbody>
</table>

(Total 29 periods per week)

**L = Lecture, T = Tutorial, P = Practical, IA=Internal Assessment**

*Elective: The student of a particular branch will not be allowed to opt for his own branch subject.*
1. For Internal Assessment (IA) of the theory papers: Two Mid-Term Tests of 20 Marks.

2. Institute can arrange a third Mid-Term Test as per the convenience of the students.

3. Syllabus shall be prepared without units.

4. The question paper shall contain seven (07) questions of 16 marks each. The first question shall cover the entire syllabus and it shall be compulsory, it shall contain eight parts of 2 marks each, and answer to be given in about 25 words. From remaining six questions, student shall attempt any four questions.

5. Passing Rules for B.Tech. (4 Yr. Course)

The result of a candidate will be worked out at the end of each Semester Examination. For a Pass, candidate must obtain marks for each theory.

<table>
<thead>
<tr>
<th>(A)</th>
<th>Theory Paper</th>
<th>Passing%</th>
<th>(B)</th>
<th>Practical/Sessionals</th>
<th>Passing%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Internal Assessment</td>
<td>Nil</td>
<td>(i)</td>
<td>Sessional (60% component)</td>
<td>40%</td>
</tr>
<tr>
<td>(ii)</td>
<td>End Semester (B.Tech.) University Exam</td>
<td>35%</td>
<td>(ii)</td>
<td>Practical (40% component) University Exam</td>
<td>40%</td>
</tr>
<tr>
<td>(iii)</td>
<td>Total of (i) &amp; (ii)</td>
<td>40%</td>
<td>(iii)</td>
<td>Total of (i) &amp; (ii)</td>
<td>50%</td>
</tr>
</tbody>
</table>
Table of Contents

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MA-101</td>
<td>ENGINEERING MATHEMATICS-I</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>HU-101</td>
<td>COMMUNICATION SKILLS</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>HU-103</td>
<td>HUMAN VALUES</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>PY-101</td>
<td>ENGINEERING PHYSICS</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>CY-101</td>
<td>ENGINEERING CHEMISTRY</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>CS-101</td>
<td>COMPUTER PROGRAMMING-I</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>CE-101</td>
<td>ENVIRONMENTAL ENGINEERING AND DISASTER MANAGEMENT</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>HU-102</td>
<td>COMMUNICATION SKILLS LAB</td>
<td>14</td>
</tr>
<tr>
<td>9</td>
<td>PY-102</td>
<td>ENGINEERING PHYSICS LAB</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>CY-102</td>
<td>ENGINEERING CHEMISTRY LAB</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>CS-102</td>
<td>COMPUTER PROGRAMMING-I LAB</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>CE-102</td>
<td>COMPUTER AIDED ENGINEERING GRAPHICS</td>
<td>17</td>
</tr>
<tr>
<td>13</td>
<td>ME-102</td>
<td>MECHANICAL WORKSHOP PRACTICE</td>
<td>18</td>
</tr>
<tr>
<td>14</td>
<td>MA-102</td>
<td>ENGINEERING MATHEMATICS-II</td>
<td>19</td>
</tr>
<tr>
<td>15</td>
<td>CS-103</td>
<td>COMPUTER PROGRAMMING-II</td>
<td>20</td>
</tr>
<tr>
<td>16</td>
<td>EE-101</td>
<td>BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</td>
<td>21</td>
</tr>
<tr>
<td>17</td>
<td>CE-103</td>
<td>BASIC CIVIL ENGINEERING</td>
<td>22</td>
</tr>
<tr>
<td>18</td>
<td>ME-102</td>
<td>BASIC MECHANICAL ENGINEERING</td>
<td>23</td>
</tr>
<tr>
<td>19</td>
<td>OE-101</td>
<td>ENGINEERING MECHANICS</td>
<td>24</td>
</tr>
<tr>
<td>20</td>
<td>CS-104</td>
<td>COMPUTER PROGRAMMING-II LAB</td>
<td>25</td>
</tr>
<tr>
<td>21</td>
<td>ME-104</td>
<td>COMPUTER AIDED MACHINE DRAWING</td>
<td>26</td>
</tr>
<tr>
<td>22</td>
<td>HU-104</td>
<td>HUMAN VALUES: ACTIVITIES</td>
<td>27</td>
</tr>
</tbody>
</table>
MA-101 ENGINEERING MATHEMATICS-I

Course Code: MA-101       Course Name: Engineering Mathematics-I
L-T-P: 3-1-0
Maximum Marks: 80

Differential Calculus:
Asymptotes (Cartesian coordinates only), concavity, convexity and point of inflection,
Curve tracing (Cartesian and standard Polar curves- Cardioids, Lemniscates of Bernoulli,
Limacon, Equiangular Spiral only).
Limit, continuity and differentiability of functions of two variables, Partial differentiation,
Euler's theorem on homogeneous functions, change of variables, chain rule, Gradient,
Directional derivative, Tangent planes and Normals.
Taylor's theorem (two variables), approximate calculations, Jacobian, maxima & minima of
two and more independent variables, Lagrange's method of multipliers.

Integral Calculus:
Double integral, change of order of integration, Double integral by changing into Polar
form, Applications of Double integrals for evaluating areas & volumes, triple integral; Beta
function and Gamma function (simple properties).

Vector Calculus:
Scalar and vector field, differentiation & integration of vector functions: Gradient,
Divergence, Curl and Differential Operator; Line, Surface and Volume integrals; Green's
theorem in a plane, Gauss’s and Stoke’s theorem (without proof) and their applications.

Suggested Readings:

1. Thomas' Calculus, George B. Thomas, Jr., Maurice D. Weir, Joel R. Hass, Pearson
   Educations.
2. Calculus with Early Transcendental Functions, James Stewart, Cengage Lerning
   Publication.
   Education.
HU-101 COMMUNICATION SKILLS

Course Code: HU-101     Course Name: Communication Skills
L-T-P: 3-0-0     Maximum Marks: 80

Communication: Meaning, Importance and Cycle of Communication, Media and Types of Communication, Formal and Informal Channels of Communication, Barriers to Communication, Division of Human Communication and Methods to Improve Interpersonal Communication, Qualities of Good Communication.


Poems: ‘No Men are Foreign’ by James Kirkup, ‘If’ by Rudyard Kipling, ‘Where the Mind is without Fear’ by Rabindranath Tagore.

Suggested Readings:

1. Communication Skills, Pushplata & Sanjay Kumar, Oxford University Press, India.
2. The Written Word, Vandana Singh, Oxford University Press, India.
HU-103 HUMAN VALUES

Course Code: HU-103        Course Name: Human Values
L-T-P: 3-0-0              Maximum Marks: 80

**Course Introduction - Need, Basic Guidelines, Content and Process for Value Education**
Understanding the need, basic guidelines, content and process for Value Education
Self Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration
Continuous Happiness and Prosperity- A look at basic Human Aspirations
Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
Method to fulfill the above human aspirations: understanding and living in harmony at various levels

**Understanding Harmony in the Human Being - Harmony in Myself**
Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
Understanding the needs of Self (‘I’) and ‘Body’ - Sukh and Suvidha
Understanding the Body as an instrument of ‘I’ (‘I’ being the doer, seer and enjoyer)
Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
Understanding the harmony of ‘I’ with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail
Programs to ensure Sanyam and Swasthya

**Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship**
Understanding harmony in the Family- the basic unit of human interaction
Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti;
Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
Understanding the meaning of Vishwas; Difference between intention and competence
Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals
Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!

**Understanding Harmony in the Nature and Existence - Whole existence as Co-existence**
Understanding the harmony in the Nature
Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space
Holistic perception of harmony at all levels of existence
Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values
Definitiveness of Ethical Human Conduct
Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
Competence in Professional Ethics:
  a) Ability to utilize the professional competence for augmenting universal human order,
  b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models
Case studies of typical holistic technologies, management models and production systems
Strategy for transition from the present state to Universal Human Order:
  a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

Suggested Readings:

4. R. Subramanian, Professional Ethics includes Human Values, Oxford Univ. Press.
PY-101 ENGINEERING PHYSICS

Course Code: PY-101         Course Name: Engineering Physics
L-T-P: 3-1-0             Maximum Marks: 80

Interference of light: Michelson’s Interferometer: Production of circular & straight line fringes; Determination of wavelength of light; Determination of wavelength separation of two nearby wavelengths. Optical technology: Elementary idea of anti-reflection coating and interference filters.

Diffraction and Polarization of light: Fraunhofer Diffraction at Single Slit. Diffraction grating: Construction, theory and spectrum; Determination of wavelength of light. Resolving power: Raleigh criterion; Resolving power of diffraction grating and telescope. Plane, circularly and elliptically polarized light on the basis of electric (light) vector: Malus law; Double Refraction; Phase retardation plates and their use in production and detection of circularly and elliptically polarized light; Optical activity and laws of optical rotation; specific rotation and its measurement using half-shade device.

Elements of Material Science: Bonding in solids; covalent bonding and Metallic bonding; Classification of solids as Insulators, Semiconductors and Conductors; X-Ray diffraction and Bragg's Law. Hall Effect: Theory, Hall Coefficient and applications.

Quantum Mechanics: Compton effect & quantum nature of light; Derivation of time dependent and time independent Schrodinger's Wave Equation; Physical interpretation of wave function and its properties; boundary conditions; Particle in one dimensional box.

Coherence and Optical Fibers: Spatial and temporal coherence; Coherence length; Coherence time and ‘Q’ factor for light; Visibility as a measure of Coherence and spectral purity; Optical fiber as optical wave guide; Numerical aperture; Maximum angle of acceptance and applications of optical fiber.

Laser and Holography: Theory of laser action; Einstein’s coefficients; Components of laser; Threshold conditions for laser action; Theory, Design and applications of He-Ne and semiconductor lasers; Holography versus photography, Basic theory of holography; basic requirement of a Holographic laboratory; Applications of Holography in microscopy and interferometry.

Suggested Readings:

1. Engineering Physics: Malik and Singh (Tata McGraw Hill)
2. Engineering Physics: Naidu (Pearson)
3. Optics : Ajay Ghatak (Tata McGraw Hill)
5. Fundamental of Optics : Jetkins and White (Tata McGraw Hill)
6. Material Science: Smith (McGraw Hill)
Water:
Common natural impurities, hardness, determination of hardness by complexometric (EDTA method), degree of hardness. Municipal water supply, requisite of drinking water, purification of water, sedimentation, filtration, sterilization, breakpoint chlorination. Water for steam making and boiler troubles, formation of solids (Scale and Sludge formation), carryover (Foaming and Priming), boiler corrosion and caustic embrittlement, Methods of boiler water treatment (water softening) preliminary treatments, preheating, Lime-Soda process, Zeolite (Permutit) process, Deionization (Demineralization) process. Numerical problems based on hardness, Lime-Soda and zeolite process.

Organic Fuels:

Polymers:
Classification, constituents, general properties of polymers and their uses. Preparation properties and uses of polyethylene, polyethylene terephthalate (PET), nylon 6, nylon 66, nylon 6, 10, Kevlar, Bakelite. Elastomers – natural rubber and vulcanization, synthetic rubbers viz. Buna-S, Buna –N, Butyl and Neoprene Rubbers. Conducting polymers-.

Lubricants:
Classification, types of lubrication, properties and uses. Viscosity and viscosity index, flash and fire point, cloud and pour point. Emulsification and steam emulsion number.

Corrosion and its control:
Definition and its significance. Mechanism of chemical (dry) and electrochemical (wet) corrosion, galvanic corrosion, concentration type corrosion and pitting corrosion. Protection from corrosion- protective coatings-galvanization and tinning, cathodic protection, sacrificial anode and modifications in design.

Inorganic Engineering Materials:
Suggested Readings:

3. The Chemistry and Technology of Coal, by J G Speigh, CRC Press.
5. Polymer Chemistry: An Introduction, Malcolm P. Stevens, Oxford University Press.
CS-101 COMPUTER PROGRAMMING-I

Course Code: CS-101
L-T-P: 3-0-0
Course Name: Computer Programming-I
Maximum Marks: 80
CE-101 ENVIRONMENTAL ENGINEERING AND DISASTER MANAGEMENT

Course Code: CE-101        Course Name: Environmental Engineering and Disaster Management
L-T-P: 3-0-0              Maximum Marks: 80


Rain water harvesting: Reuse and saving in use of water, methods of rain water harvesting.

Solid Waste Management: Classification of solid waste, Collection, transportation, treatment, and disposal of solid waste. Economic recovery of solid waste. Sanitary landfill, on site sanitation. Energy interaction from solid waste.

Air and Noise Pollution: Primary and Secondary air pollutants, Air Pollution, Harmful effects of Air Pollution, Control of Air Pollution. Noise Pollution, Harmful effects of noise pollution, control of noise pollution, Global warming, Acid rain, Ozone depletion, Green House effect


Disaster Management: Understanding Disasters and Hazards and related issues social and environmental. Risk and Vulnerability. Types of Disasters, their occurrence/ causes, technical terminology involved, impact and preventive measures.

Suggested Readings:
3. Selected Resources available on www.nidmindia.nic.in
4. Basic Environmental Engineering by Prof. R.C. Gaur, New Age International Publication.
HU-102 COMMUNICATION SKILLS LAB

Course Code: HU-102
L-T-P: 0-0-2
Course Name: Communication Skills Lab.
Maximum Marks: 75

1. Phonetic Symbols and Transcriptions
2. Extempore
3. Group Discussion
4. Dialogue Writing
5. Listening Comprehension
6. Word Formation
7. Synonyms and Antonyms
8. Affixes

(Note: Wherever appropriate, Language Lab Software is to be used to improve listening comprehension and speaking skills.)

Suggested Readings:

4. Communication Skills, Pushplata & Sanjay Kumar, Oxford University Press, India.
PY-102 ENGINEERING PHYSICS LAB

Course Code: HU-102  Course Name: Engineering Physics Lab
L-T-P: 0-0-2        Maximum Marks: 75

1. To determine the wave length of monochromatic light with the help of Michelson's interferometer.
2. To determine the wave length of sodium light by Newton’s Ring.
3. To determine the specific rotation of glucose (sugar) solution using polarimeter.
4. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
5. To study the variation of a semiconductor resistance with temperature and hence determine the band gap of the semiconductor in the form of reverse biased P-N junction diode.
6. To determine the height of water tank with the help of sextant.
7. To determine the dispersive power of material of a prism for violet and yellow colour's of mercury light with the help of spectrometer.
8. To study the charge and discharge of a condenser and hence determine the same constant (both current and voltage graphs are to be plotted.
9. To verify the expression for the resolving power of a Telescope.
10. To determine the coherence length and coherence time of laser using He – Ne laser.
11. To determine the specific resistance of the material of a wire by Carey Froster's bridge.

CY-102 ENGINEERING CHEMISTRY LAB

Course Code: HU-102  Course Name: Engineering Chemistry Lab
L-T-P: 0-0-2        Maximum Marks: 75

1. To determine the hardness of water by HCL method.
2. To determine the hardness of water by EDTA method
4. Study of Bomb Calorimeter.
5. To determine the strength of Ferrous Ammonium sulphate solution with the help of $K_2Cr_2O_7$ solution.
6. To determine the strength of $CuSO_4$ solution with the help of hypo solution.
7. To determine the strength of NaOH and $Na_2CO_3$ in a given alkali mixture.
8. To determine the flash and fire point of a given lubricating oil.
9. To determine the viscosity of a given lubricating oil by Redwood viscometer.
10. To determine cloud and pour point of lubricating oil.
CS-102 COMPUTER PROGRAMMING-I LAB

Course Code: CS-102
L-T-P: 0-0-2
Course Name: Computer Programming-I Lab
Maximum Marks: 100
CE-102 COMPUTER AIDED ENGINEERING GRAPHICS

Course Code: CE-102       Course Name: Computer Aided Engineering Graphics
L-T-P: 0-0-3            Maximum Marks: 100

Projections of Point & Lines: Positions of Point, Notation system, systematic Approach for projections of points, Front view & Top view of point, Positions of straight lines, line parallel to Both the RPs, Line perpendicular to either of the RPs, Line inclined to one RP and parallel to the other, Line Inclined to Both the RPs, Traces of a line (One drawing sheet, one assignment in sketch book)

Projections of planes: Positions of planes, Terms used in projections of planes, plane parallel to RP, plane inclined to one RP and perpendicular to the other RP, plane perpendicular to Both the RPs, plane Inclined to Both RPs, True shape of the plane, Distance of a point from plane, Angle between two planes (no drawing sheet required, only assignment in sketch book)

Projection of solids: Basic solids, Frustums and truncated solids, Positions of the solids, solid with Axis perpendicular to an RP, solid with axis inclined to one RP and parallel to the other solid with axis Inclined to Both the RPs Solid with Axis parallel to Both the RPs (One drawing sheet, one assignment in sketch book)

Section of solids: Theory of sectioning, section of prisms and cubes, sections of pyramids and Tetrahedron section of Cylinders, Section of cones, Section of spheres (One drawing sheet, one assignment in sketch book)

Development of surfaces: Methods of development, parallel line developments, Radial line Development, Anti- Development (One drawing sheet, one assignment in sketch book)

Isometric Projection: Principle of Isometric Projection Isometric scale, Isometric projections and Isometric Views, Isometric Views of standard shapes, Isometric views of standard solids (One drawing sheet, one assignment in sketch book)

Computer Aided Drafting: Introduction to CAD, Advantages of CAD software’s, Auto CAD, Auto CAD Commands and tool bars, Creating the Drawing, Charging properties, Dimensioning other object, Text editing, Isometric drawing (Four assignments on the computer)

Suggested Readings:

5. Engineering Drawing with an introduction to AutoCAD, Dhananjay A Jolhe
6. Engineering Drawing with AutoCAD, B.V.R. Gupta and M. Rajaroy
7. AutoCAD 2017 for Engineers & Designers (Basic and Intermediate), Sham Tickoo,
ME-101 MECHANICAL WORKSHOP PRACTICE

Course Code: ME-101                Course Name: Mechanical Workshop Practice
L-T-P: 0-0-2                        Maximum Marks: 100

Carpentry Shop:
1. T – Lap joint
2. Bridle joint

Foundry Shop:
1. Mould of any pattern
2. Casting of any simple pattern

Welding Shop:
1. Lap joint by gas welding
2. Butt joint by arc welding
3. Lap joint by arc welding
4. Demonstration of brazing, soldering & gas cutting

Machine Shop Practice:
1. Demonstration of various machine tools such as Lathe, Shaper, Milling, Grinding and Drilling

Fitting Shop
1. Finishing of two sides of a square piece by filing
2. Making mechanical joint and soldering of joint on sheet metal
3. To cut a square notch using hacksaw and to drill a hole and tapping

Sheet Metal Shop
   Making of Funnel using sheet metal

Suggested Readings:

1. Elements of Workshop Technology Hajra & Choudhary, Media Promoters & Publisher.
MA-102 ENGINEERING MATHEMATICS-II

Course Code: MA-102                   Course Name: Engineering Mathematics-II
L-T-P: 3-1-0              Maximum Marks: 80

Linear Algebra:
Rank of a matrix, Normal forms, consistency of systems of linear simultaneous equations and its solutions, Linear dependence and independence of vectors, Eigen values and Eigen vectors, Cayley-Hamilton theorem (without proof), orthogonal matrices, diagonalization of matrix.

Fourier Series:
Orthogonal functions, periodic functions, Fourier series of periodic functions, Euler formula, change of intervals, Even and Odd functions, half range Fourier sine and cosine series; Harmonic analysis.

Differential Equations:
Linear differential equations of first order, Reducible to linear form, Exact differential equations, reducible to exact form; Linear Differential Equations of Higher order with constant coefficients, Simultaneous linear differential equations.
Second order linear ODE with variables coefficients, Homogenous and exact forms, Change of dependent and independent variables; Variation of parameters, Method of Undetermined coefficients, Euler-Cauchy equations.
Partial Differential Equations: Order and Degree, Formation; Linear partial differential equations of first order: Lagrange’s form, Standard forms, Charpit’s method.
Solutions of PDE of Second order using separation of variable method.

Suggested Readings:
CS-103 COMPUTER PROGRAMMING-II

Course Code: CS-103
L-T-P: 3-0-0
Course Name: Computer Programming-II
Maximum Marks: 80
EE-101 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code: EE-101        Course Name: Basic Electrical and Electronics Engineering
L-T-P: 3-0-0              Maximum Marks: 80


Transformers: Construction, EMF equation, ratings, phasor diagram on no load and full load, equivalent circuit, regulation and efficiency calculations, open and short circuit tests, auto-transformers

Alternating Quantities: Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System.

Rotating Electrical Machines; DC Machines: Principle of Operation of DC Machine as Motor and Generator, EMF Equation, Applications of DC Machines. AC Machines: Principle of Operation of 3-Phase Induction Motor, 3-Phase Synchronous Motor and 3-Phase Synchronous Generator (Alternator), Applications of AC Machines.


Electrical Measuring Instruments: DC PMMC instruments, shunt and multipliers, multimeters, Moving iron ammeters and voltmeters, dynamometer, wattmeter, AC watthour meter, extension of instrument ranges.

Suggested Readings:

1. Basic Electrical and Electronics Engineering by Sukhija and Nagsarkar, Oxford Publication
2. Basic Electrical & Electronics Engineering by Kothari, Nagrath, TMH
3. Basic Electrical & Electronics Engineering by V. Jagathesan, K. Vinod Kumar & R. Saravan Kumar, Wiley India.
4. Basic Electrical & Electronics Engineering by Van Valkenburge, Cengage learning Indian Edition
5. Basic Electrical and Electronics Engineering by Muthusubrmaniam, TMH
6. Fundamentals of Electrical and Electronics Engineering by Ghosh, Smarajit, PHI India
7. Basic Electrical & Electronics Engineering by Ravish Singh, TMH
8. Basic Electronics Engineering by Vijay Baru et al, Dream Tech, New Delhi
9. Electrical and Electronic Technology by Edward Hughes et al, Pearson Publication
10. Basic Electrical Engineering by A.E. Fitzgerald, TMH

**CE-103 BASIC CIVIL ENGINEERING**

Course Code: CE-103
L-T-P: 3-0-0
Course Name: Basic Civil Engineering
Maximum Marks: 80

**Introduction:** Specialization of Civil Engineering, scope of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.

**Surveying:** Object & principles of Surveying, plans and maps, Scales, Unit of measurement.

**Linear measurements:** Direct measurements- Tape & Chain, Ranging out survey lines, taking measurements of sloping ground. Tape correction, conventional symbols. Introduction to Compass Surveying & Leveling. Introduction to total station.

**Building & Building materials:**
Construction materials: Stone, Brick, Cement, Mortar, Concrete, Steel – their properties & uses.
Selection of site for Buildings, types of buildings, plinth area, carpet area, floor space index, Introduction to building byelaws, concept of sun light and ventilation.
Components of Buildings & their functions, Basic concept of R.C.C., Introduction to types of foundation.

**Transportation, Traffic and Road Safety:** Types and characteristics of various modes of transportation, various road traffic signs, causes of accidents and road safety measures.

**Suggested Readings:**
1. Palancharmy, Basic Civil Engineering, McGraw Hill publishers.
ME-102 BASIC MECHANICAL ENGINEERING

Course Code: ME-102
L-T-P: 3-0-0
Maximum Marks: 80

Fundamentals:

Introduction to mechanical engineering, concepts of thermal engineering, mechanical machine design, industrial engineering and manufacturing technology.

Steam Boilers, Steam Turbines and Power Plants:
Introduction, classification and types of steam boilers and steam turbines. Discuss working of steam boilers and steam turbines.
Introduction and Classification of power plants.

Pumps and IC Engines:
Applications and working of Reciprocating and Centrifugal pumps.
Introduction, Classification of IC Engines, Main Components of IC Engines, Working of IC Engines and its components.

Refrigeration and Air Conditioning:
Introduction, classification and types of refrigeration systems and air-conditioning. Applications of refrigeration and Air-conditioning.

Transmission of Power:
Introduction and types of Belt and Rope Drives.
Introduction to Gears and Gear Trains.

Primary Manufacturing Processes:
Metal Casting Process: Introduction to Casting Process, Patterns, Molding, Furnaces.
Metal Forming Processes: Introduction to Forging, Rolling, Extrusion, Drawing.
Metal Joining Processes: Introduction to various types of Welding, Gas Cutting, Brazing, and Soldering.
Metal Removal or Machining Processes: Introduction to machining process and various machine tools.

Engineering Materials and Heat Treatment of Steel:
Introduction to various engineering materials and their properties.
Introduction to Heat Treatment and types of Heat Treatment Processes.

Introduction to CAD, CAM, FMS, MEMS and CIM:
Introduction to modern manufacturing systems and their applications.

Suggested Readings:

OE-101 ENGINEERING MECHANICS

Course Code: OE-101          Course Name: Engineering Mechanics
L-T-P: 3-0-0                  Maximum Marks: 80


Centroid & Moment of inertia (M.I): Location of centroid, Moment of inertia (mass and area), Parallel axis and perpendicular axis theorems, M.I of composite section, M.I. of solid bodies, Polar moment of inertia.

Virtual work: Principle of Virtual Work, Active forces and active force diagram, Stability of equilibrium.


Kinematics of particles and rigid bodies: Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular acceleration, Radial and transverse velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion.

Kinetics of particles and rigid bodies: Newton's second law, Equation of motion in rectangular coordinate, Equation of motion in radial and transverse components, Equation of motion in plane for a rigid body, D'Alembert principle.


Impulse and Momentum: Linear and angular momentum, Linear and angular impulse, Principle of momentum for a particle and rigid body, Principle of linear impulse and momentum for a particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular momentum, Angular momentum of rigid body, Principle of impulse and momentum for a rigid body, Central impact, System of variable mass.

Suggested Readings:
CS-104 COMPUTER PROGRAMMING-II LAB

Course Code: CS-104
L-T-P: 0-0-2
Course Name: Computer Programming-II Lab
Maximum Marks: 100
ME-104 COMPUTERS AIDED MACHINE DRAWING

Course Code: ME-104              Course Name: Computer Aided Machine Drawing
L-T-P: 0-0-3                   Maximum Marks: 100

Introduction: Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules of dimensioning.

Conversion of pictorial views into orthographic views: (1 drawing sheet) Introduction to orthographic projection, concept of first angle and third angle projection, drawing of simple machine elements in first angle projection, missing view problems.

Sectional view: (1 drawing sheet) Introduction, cutting plane line, type of sectional views—full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions—spokes, web, rib, shaft, pipes, different types of holes, conventions of section lines for different metals and materials.

Fasteners: (1 drawing sheet) Temporary and permanent fasteners, thread nomenclature and forms, thread series, designation, representation of threads, bolted joints, locking arrangement of nuts, screws, washers, foundation bolts etc., keys, types of keys, cotter and knuckle joints. Riveted joints, rivets and riveting, types of rivets, types of riveted joints etc.

Assembly drawing: (1 drawing sheet) Introduction to assembly drawing, assembly drawing of simple machine elements; like rigid or flexible coupling, muff coupling, plunger block, footstep bearing, bracket etc.

Free hand sketching: Need for free hand sketching, Free hand sketching of conventional representation of materials, screw fasteners, foundation bolts, studs.

Bearing: Ball, roller, needle, foot step bearing.

Coupling: Protected type, flange, and pin type flexible coupling.

Other components: Welded joints, belts and pulleys, pipes and pipe joints, valves etc.

Computer aided drafting: Concepts of computer aided 2D drafting using any drafting software like AutoCAD/ Solid works/Creo/Catia etc., basic drawing and modify commands, making 2D drawings of simple machine parts.

Suggested Readings:

1. Laxminarayan and M.L. Mathur, Machine Drawing, Jain Brothers
5. Ostrowsky, O., Engineering Drawing with CAD Applications, ELBS, 1995
PS 1:
Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your salient achievements and shortcomings in your life? Observe and analyze them.

PS 2:
Now-a-days, there is a lot of talk about many technogenic maladies such as energy and material resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. - all these seem to be manmade problems, threatening the survival of life Earth - What is the root cause of these maladies & what is the way out in opinion?

On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, breakdown of relationships, generation gap, depression & suicidal attempts etc. - what do you think, is the root cause of these threats threats to human happiness and peace - what could be the way out in your opinion?

PS 3:
1. Observe that each of us has the faculty of ‘Natural Acceptance’, based on which one can verify what is right or not right for him. (As such we are not properly trained to listen to our ‘Natural Acceptance’ and may a time it is also clouded by our strong per-conditioning and sensory attractions).

Explore the following:
(i) What is Naturally Acceptable’ to you in relationship the feeling of respect or disrespect for yourself and for others?
(ii) What is ‘naturally Acceptable’ to you - to nurture or to exploit others?

Is your living in accordance with your natural acceptance or different from it?

2. Out of the three basic requirements for fulfillment of your aspirations - right understanding, relationship and physical facilities - observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

PS 4:
list down all your important desires. Observe whether the desire is related to Self (I) or the Body. If it appears to be related to both, visualize which part of it is related to Self (I) and which part is related to Body.
PS 5:

1. a. Observe that any physical facility you use, follows the given sequence with time:

   Necessary and tasteful - unnecessary but still tasteful - unnecessary and tasteless - intolerable

   b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If not acceptable, you want it continuously and if not acceptable, you do not want it any moment!

2. List down all your important activities. Observe whether the activity is of ‘I’ or of Body or with the participation of both or with the participation of both ‘I’ and Body.

3. Observe the activities within ‘i’. Identify the object of your attention for different moments (over a period of sy 5 to 10 minutes) and draw a line diagram connecting these points. Try observe the link between any two nodes.

PS 6:

1. Chalk out some programs towards ensuring your harmony with the body - in terms of nurturing, protection and right utilisation of the body.

2. Find out the plants and shrubs growing in and around your campus, which can be useful in curing common diseases.

PS 7:

Form small groups in the class and make them carry out a dialogue focusing on the following eight questions related to ‘TRUST’;

1a. Do I want to make myself happy?

2a. Do I want to make the other happy?

3a. Does the other want to make himself/herself happy?

4a. Does the other want to make me happy?

What is the answer?

Intention (Natural Acceptance)

1b. Am I able to always make myself happy?

2b. Am I able to always make the other happy?

3b. Is the other able to always make himself/herself happy?

What is the answer?

Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate yourself and others on the basis of intention/competence.
PS 8:
1. Observe, on how many occasions, you are able to respect your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under-evaluation, over-evaluation or otherwise evaluation.
2. Also, observe whether your feeling of respect is based on treating the other as you would treat yourself or on differentiations based on body, physical facilities or belieds.

PS 9:
1. Write a narration in the form of a story, poem, skit or essay to clarify a salient Human Value to the children.
2. Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation.

PS 10:
List down some common units (things) of Nature which you come across in your daily life and classify them in the four orders of Nature. Analysis and explain the aspect of mutual fulfillment of each unit with other orders.

PS 11:
Make a chart to show the whole existence as co-existence. With the help of this chart try to identify the role and the scope of some of the courses of your study. Also indicate the areas which are being either over-emphasized or ignored in the present context.

PS 12:
Identify any two important problems being faced by the society today and analyze the root cause of these problems. Can these be solved on the basic of natural acceptance of human values. If so, how should one proceed in this direction from the present situation?

PS 13:
1. Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order.
2. Propose a broad outline for humanistic Constitution at the level of Nation.

PS 14:
The course is going to be over now. It is time to evaluate what difference in your thinking it has made. Summarize the core massage of this course grasped by you. How has this affected you in terms of;

a. Thought
b. Behavior
c. Work and
d. Relization
What practical steps are you able to visualize for the transition of the society from its present state.

**Project:**

*Every student required to take-up a social project e.g. educating children in needy/weaker section, services in hospitals, NGO’s and other such work*