A. CURRICULUM - B.Tech. For Group I (CE, ME, CS, IT)

I SEMESTER

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Category</th>
<th>Periods</th>
<th>Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA101</td>
<td>Mathematics I</td>
<td>TB</td>
<td>3 1 -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>PH101</td>
<td>Engineering Physics</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>CY101</td>
<td>Engineering Chemistry</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>BE102</td>
<td>Basic Electrical and Electronics Engineering</td>
<td>TC</td>
<td>3 1 -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>ME101</td>
<td>Engineering Thermodynamics</td>
<td>TA</td>
<td>3 1 -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>CS101</td>
<td>Computer Programming</td>
<td>TA</td>
<td>3 1 -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>ME102</td>
<td>Engineering Graphics</td>
<td>EGD</td>
<td>2 - 3</td>
<td>50 50</td>
<td>100 4</td>
</tr>
<tr>
<td>CS102</td>
<td>Computer Programming Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40</td>
<td>100 2</td>
</tr>
<tr>
<td>BE103</td>
<td>Basic Electrical and Electronics Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40</td>
<td>100 2</td>
</tr>
</tbody>
</table>

Total Credits 32

II SEMESTER

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Category</th>
<th>Periods</th>
<th>Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA102</td>
<td>Mathematics II</td>
<td>TB</td>
<td>3 1 -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>PH102</td>
<td>Material Science</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>CY102</td>
<td>Environmental Science</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>BE101</td>
<td>Basic Civil and Mechanical Engineering</td>
<td>TC</td>
<td>4 - -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>CE101</td>
<td>Engineering Mechanics</td>
<td>TB</td>
<td>3 1 -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>HS101</td>
<td>Communicative English</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60</td>
<td>100 4</td>
</tr>
<tr>
<td>PH103</td>
<td>Physics Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40</td>
<td>100 2</td>
</tr>
<tr>
<td>CY103</td>
<td>Chemistry Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40</td>
<td>100 2</td>
</tr>
<tr>
<td>ME103</td>
<td>Workshop Practice</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40</td>
<td>100 2</td>
</tr>
</tbody>
</table>

Total Credits 30

# CA – Continuous Assessment, SE – Semester Examination, TM – Total Marks

B. CURRICULUM - B.Tech. For Group II (EC, EE, EI, CH)

I SEMESTER

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Category*</th>
<th>Periods</th>
<th>Marks#</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA101</td>
<td>Mathematics I</td>
<td>TB</td>
<td>3 1 -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>PH101</td>
<td>Engineering Physics</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>CY101</td>
<td>Engineering Chemistry</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>BE101</td>
<td>Basic Civil and Mechanical</td>
<td>TC</td>
<td>4 - -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Engineering Mechanics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE101</td>
<td>Engineering Mechanics</td>
<td>TB</td>
<td>3 1 -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>HS101</td>
<td>Communicative English</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>PH103</td>
<td>Physics Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40 100</td>
<td>2</td>
</tr>
<tr>
<td>CY103</td>
<td>Chemistry Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40 100</td>
<td>2</td>
</tr>
<tr>
<td>ME103</td>
<td>Workshop Practice</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40 100</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Credits 30

II SEMESTER

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Category*</th>
<th>Periods</th>
<th>Marks#</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA102</td>
<td>Mathematics II</td>
<td>TB</td>
<td>3 1 -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>PH102</td>
<td>Material Science</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>CY102</td>
<td>Environmental Science</td>
<td>TA</td>
<td>4 - -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>BE102</td>
<td>Basic Electrical and Electronics Engineering</td>
<td>TC</td>
<td>3 1 -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>ME101</td>
<td>Engineering Thermodynamics</td>
<td>TA</td>
<td>3 1 -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>CS101</td>
<td>Computer Programming</td>
<td>TA</td>
<td>3 1 -</td>
<td>40 60 100</td>
<td>4</td>
</tr>
<tr>
<td>ME102</td>
<td>Engineering Graphics</td>
<td>EGD</td>
<td>2 - 3</td>
<td>50 50 100</td>
<td>4</td>
</tr>
<tr>
<td>CS102</td>
<td>Computer Programming Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40 100</td>
<td>2</td>
</tr>
<tr>
<td>BE103</td>
<td>Basic Electrical and Electronics Laboratory</td>
<td>LB</td>
<td>- - 3</td>
<td>60 40 100</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Credits 32

# CA – Continuous Assessment, SE – Semester Examination, TM – Total Marks

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA101</td>
<td>Mathematics I</td>
<td>3 1 -</td>
<td>4</td>
<td>40 60 100</td>
</tr>
</tbody>
</table>

**Prerequisite**
- 

**Objectives**
- To introduce the ideas of differential and integral calculus
- To familiarize students with functions of several variables
- To introduce methods for solving differential equations

**Outcome**
- Understands Calculus
- Functions of several variables
- Able to solve differential equations

---

**UNIT – I**
**Hours: 09**
Curvature, radius of curvature, evolutes and involutes. Beta and Gamma functions and their properties.

**UNIT – II**
**Hours: 09**
Partial derivatives, Total derivative, Differentiation of implicit functions, Change of variables, Jacobians and their properties, Partial differentiation of implicit functions, Maxima and minima of functions of two variables, Lagrange’s method of undetermined multipliers.

**UNIT – III**
**Hours: 09**
Multiple Integrals, change of order of integration in double integrals, Applications: Plane areas (double integration), Change of variables (Cartesian to polar), volumes by solids of revolution, double and triple integrations (Cartesian and polar) – Center of mass and Gravity (constant and variable densities).

**UNIT – IV**
**Hours: 09**
Exact equations, First order linear equations, Bernoulli’s equation, orthogonal trajectories, growth, decay and geometrical applications. Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut’s type.

**UNIT – V**
**Hours: 09**
Linear differential equations of higher order - with constant coefficients, the operator D, Euler’s linear equation of higher order with variable coefficients, simultaneous linear differential equations, solution by variation of parameters method.

**Total contact Hours: 45**  **Total Tutorials: 15**  **Total Practical Classes: 5**  **Total Hours: 60**

**Text Books:**

**Reference Books:**
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH101</td>
<td>Engineering Physics</td>
<td>4 - - - - 4</td>
<td>40</td>
<td>60</td>
</tr>
</tbody>
</table>

**Prerequisite**
- -

**Objectives**
- To provide a bridge between basic Physics and Engineering courses.
- To introduce the concepts and applications of Ultrasonics, Optics, Lasers, Optical Fibers, and wave mechanics and fundamentals of crystal structure.

**Outcome**
- At the end of the course, Students would have adequate exposure to the concepts of the various topics of this Engineering Physics course and their real life applications.

**UNIT – I  Acoustics and Ultrasonics**  **Hours: 12**


**UNIT – II  Optics**  **Hours: 12**

**Interference:** Air Wedge – Michelson’s Interferometer – Types of fringes- Determination of Wavelength of a light source- Antireflection Coatings -Interference Filter; **Diffraction:** Concept of Resolution of Spectral lines-Rayleigh’s criterion -Resolving Power of Grating, Prism & Telescope; **Polarisation** : Basic concepts of Double Refraction and Optical Rotation- Quarter and Half Wave Plates – Specific Rotatory Power – Lalent’s Half Shade Polarimeter-polarizing filters.

**UNIT – III  Crystal Structure and Lattice Defects**  **Hours: 12**

**Crystal structure:** Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices- Atomic Radius, Coordination Number and Packing Factor of SC, BCC, FCC, HCP structures – Miller Indices- Powder X Ray Diffraction Method; **Lattice Defects:** Qualitative ideas of point, line, surface and volume defects and their influence on properties of solids

**UNIT – IV  Wave Mechanics**  **Hours: 12**

**Matter Waves – de Broglie hypothesis – Uncertainty Principle – Schrodinger Wave Equations – Time Dependent – Time Independent – Application to Particle in a One Dimensional potential Box –Concept of Quantum Mechanical Tunneling (without derivation) – Applications of tunneling (qualitative) to Alpha Decay, Tunnel Diode, Scanning Tunneling Microscope.**

**UNIT – V  Lasers and Fiber Optics**  **Hours: 12**

**Lasers** : Principles of Laser – Spontaneous and Stimulated Emissions - Einstein’s Coefficients – population Inversion and Laser Action –optical resonators(qualitative)- Types of Lasers – Nd:YAG, CO\textsubscript{2} laser, GaAs Laser- Industrial & Medical applications of Lasers; **Fiber Optics:** Principle and Propagation of light in optical fiber– Numerical aperture and acceptance angle – Types of optical fibers-based on Material, refractive index profile, Modes of propagation(single & Multimode Fibres) -Qualitative ideas of attenuation in optical Fibers-Applications of Optical Fibers- Fiber Optic communication (Schematic), Active and passive fiber optic sensors, Endoscope

**Total contact Hours: 60**

**Total Tutorials: -**

**Total Practical Classes: -**

**Total Hours: 60**

**Text Books:**

**Reference Books:**
7. 
UNIT – I  Water Treatment  Hours: 12

UNIT – II  Industrial Polymers  Hours: 12

UNIT – III  Electrochemical Cells  Hours: 12

UNIT – IV  Corrosion and Control  Hours: 12

UNIT – V  Engineering Materials  Hours: 12

Total contact Hours: 60  Total Tutorials: -  Total Practical Classes: -  Total Hours: 60

Text Books:

Reference Books:
Department : Electronics and Communication Engineering / Electrical and Electronics Engineering
Programme : B.Tech
Category : TC
Semester: One / Two

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE102</td>
<td>Basic Electrical and Electronics Engineering</td>
<td>3 1 - 4 40</td>
<td>60 100</td>
<td></td>
</tr>
</tbody>
</table>

Prerequisite
- To apply Kirchhoff’s law to simplify the given circuit.
- To understand the concept of AC circuit and to simplify the given RL, RC, RLC series and parallel circuits.
- To understand the principle of electromagnetic induction and the working principle of electrical machines.
- The students understand the working principle of transistor, FET, MOSFET, CMOS and their applications.
- To design adders, subtractors and to gain knowledge on sequential logic circuits.
- To understand the need for communication and acquire knowledge on different communication systems.
- To have an overview of different emerging technologies in day-to-day applications.

Objectives
- The students explored the basic terminology, laws and concepts of DC and AC circuits in electrical engineering.
- The students know the principle of operation of DC and AC electrical machines and different types of power plants.
- Will understand the importance of FET’s, MOSFET’s, CMOS and their applications.
- Will be able to design Combinational and Sequential circuits.
- Awareness towards different Communication Systems.
- Gain knowledge in the working principle of real time applications used in day today life like ATM, Microwave Oven, Bluetooth, WIFI and Computer Networks.

Outcome
- The students explored the basic terminology, laws and concepts of DC and AC circuits in electrical engineering.
- The students know the principle of operation of DC and AC electrical machines and different types of power plants.
- Will understand the importance of FET’s, MOSFET’s, CMOS and their applications.
- Will be able to design Combinational and Sequential circuits.
- Awareness towards different Communication Systems.
- Gain knowledge in the working principle of real time applications used in day today life like ATM, Microwave Oven, Bluetooth, WIFI and Computer Networks.

UNIT – I
DC Circuits

UNIT – II
AC Circuits
Concepts of AC circuits – rms value, average value, form and peak factors – Simple RL, RC and RLC series and parallel circuits – Concept of real and reactive power – Power factor – Series and parallel resonance - Introduction to three phase system - Power measurement by two wattmeter method.

UNIT – III
Electrical Machines and Power Plants
Law of Electromagnetic induction, Fleming’s Right & Left hand rule - Principle of DC rotating machine, Single phase transformer, single phase induction motor and synchronous motor (Qualitative approach only) - Layout of thermal, hydro and nuclear power generation (block diagram approach only). Components of AC transmission and distribution systems – One line diagram.

UNIT – IV
Electronics

UNIT – V
Communication

UNIT – VI
Overview of Emerging Technologies
Evolution of Mobile Communication Generations (1G, 2G, 2.5G, 3G and Beyond 3G) – Overview of Bluetooth, Wifi,
WiMax, Sensor Networks and Wireless LANs — Introduction to VLSI Technology and Embedded Systems — Internet of Things (IOT).

Microwave Ovens - RFID - Automated Teller Machines (ATM).

| Total contact Hours: | 45 | Total Tutorials: | 15 | Total Practical Classes: | - | Total Hours: | 60 |

Text Books:

**Electrical**


**Electronics and Communication**


Reference Books:

**Electrical**


**Electronics and Communication**


Web sites:

1. www.electronics-tutorials.ws
2. www.en.wikipedia.org/wiki/Telecommunication
3. www.nptel.ac.in/courses/IIT-MADRAS/Basic_Electronics../LECTURE1.pdf
### Subject Code: ME101
#### Subject: Engineering Thermodynamics

<table>
<thead>
<tr>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>L T P C CA SE TM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>- To convey the basics of the thermodynamic principles</td>
</tr>
<tr>
<td>- To establish the relationship of these principles to thermal system behaviors</td>
</tr>
<tr>
<td>- To develop methodologies for predicting the system behavior</td>
</tr>
<tr>
<td>- To establish the importance of laws of thermodynamics applied to energy systems</td>
</tr>
<tr>
<td>- To explain the role of refrigeration and heat pump as energy systems</td>
</tr>
<tr>
<td>- To develop an intuitive understanding of underlying physical mechanism and a mastery of solving practical problems in real world</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Parallels are drawn between the subject and the student’s everyday experience so that this course may be related to what the students already know.</td>
</tr>
<tr>
<td>- Students are made to understand the principles of thermodynamics and adjudge the viability of operation of any thermal system in real time applications</td>
</tr>
<tr>
<td>- Students are encouraged to make engineering judgments, to conduct independent exploration of topic of thermodynamics and to communicate the findings in a professional manner.</td>
</tr>
<tr>
<td>- Students are made to develop natural curiosity to explore the various facets of thermodynamic laws.</td>
</tr>
<tr>
<td>- While emphasizing basic laws, students are provided with modern tools to use in real time engineering problems.</td>
</tr>
</tbody>
</table>

#### UNIT – I
**Hours: 09**


#### UNIT – II
**Hours: 09**

The concept of energy, work and heat – reversible work - internal energy -Perfect gas – specific heats – Joules law - enthalpy- Conservation of Energy principle for closed and open systems - First law of thermodynamics – Application of first law to a process (flow and non-flow) – Steady flow energy equation and its engineering application - Calculation of work and heat for different processes.

#### UNIT – III
**Hours: 09**


#### UNIT – IV
**Hours: 09**


#### UNIT – V
**Hours: 09**

Reverse Carnot cycle - COP - Vapor compression refrigeration cycle and systems (only theory) - Gas refrigeration cycle - Absorption refrigeration system – Liquefaction – Solidification (only theory).

**Total contact Hours: 45**  **Total Tutorials: 15**  **Total Practical Classes: -**  **Total Hours: 60**

### Text Books:

### Reference Books:

**Web sites:**

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/
### Subject Code: CS101

**Subject**: Computer Programming

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS101</td>
<td>Computer Programming</td>
<td>3 1 - 4</td>
<td></td>
<td>40 60 100</td>
</tr>
</tbody>
</table>

### Prerequisite

- To introduce the basics of computers and information technology.
- To educate problem solving techniques.
- To impart programming skills in C language.
- To practice structured programming to solve real life problems.

### Objectives

- To introduce the basics of computers and information technology.
- To educate problem solving techniques.
- To impart programming skills in C language.
- To practice structured programming to solve real life problems.

### Outcome

On successful completion of the course, students will be able to:

- Understand the basics of computers and its related components
- Have the ability to write a computer program to solve specified problems

### UNIT – I


### UNIT – II


### UNIT – III


Strings – String I/O functions, String Library functions – Storage classes.

### UNIT – IV

Structures – Arrays and Structures – Nested structures – Structure as Argument to functions– Union

Pointers – Declaration, Initialization and Accessing Pointer variable – Pointers and arrays – pointers as argument and return value – Pointers and strings - pointers and structures.

### UNIT – V


Dynamic Memory Allocation: MALLOC, CALLOC, FREE, REALLOC

Introduction to preprocessor – Macro substitution directives – File inclusion directives – Compiler Control directives – Miscellaneous directives.

### Total contact Hours: 45 | Total Tutorials: 15 | Total Practical Classes: - | Total Hours: 60

### Text Books:


### Reference Books:

Department: Mechanical Engineering  
Programme: B.Tech

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME102</td>
<td>Engineering Graphics</td>
<td>2 - 3</td>
<td>4</td>
<td>50 50 100</td>
</tr>
</tbody>
</table>

Prerequisite:
- To convey the basics of engineering drawing
- To explain the importance of an engineering drawing
- To teach different methods of making the drawing
- To establish the importance of projects and developments made in drawing that are used in real systems

Objectives:
- From what students have already learnt and know, relation has been brought about how to bring their vision into realities.
- Students are made to follow and understand the basic of mechanical drawing
- Students are encouraged to make engineering drawing of physical object representing engineering systems.
- Students are made to develop natural curiosity to explore the various facets of engineering drawings.

Outcome:
- Introduction to Standards for Engineering Drawing practice, Lettering, Line work and Dimensioning.
- Projection of Points and Projection of lines
- Projection of Planes and Projections of solids in simple positions
- Projection of solids in complicated positions
- Sections of solids - Development of Surfaces
- Axonometric Projections: Isometric Projections (simple solids); Perspective Projections (planes and simple solids; Orthographic Projections

Text Books:
3. BIS, Engineering Drawing practices for Schools & College, SP 46 : 2003

Reference Books:
4. James D Bethune and et. al., Modern Drafting, Prentice Hall Int.,

Web sites:
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS102</td>
<td>Computer Programming Laboratory</td>
<td>-</td>
<td>3</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>- To study and understand the use of OS commands</td>
</tr>
<tr>
<td>- To get familiarity on MS-Office packages like MS-Word, MS-Excel and MS-Powerpoint</td>
</tr>
<tr>
<td>- To gain a hands on experience of compilation and execution of ‘C’ programs</td>
</tr>
<tr>
<td>- To inculcate logical and practical thinking towards problem solving using C programming.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cycle - I</th>
<th>Fundamentals of Computing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Study of OS commands</td>
</tr>
<tr>
<td></td>
<td>2. Use of mail merge in word processor</td>
</tr>
<tr>
<td></td>
<td>3. Use of spreadsheet to create Charts (XY, Bar, Pie) with necessary formulae.</td>
</tr>
<tr>
<td></td>
<td>4. Use of Power point to prepare a slide show.</td>
</tr>
</tbody>
</table>

| Hours: 09 |

<table>
<thead>
<tr>
<th>Cycle - II</th>
<th>Programming Using C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Study of Compilation and execution of simple C programs</td>
<td></td>
</tr>
<tr>
<td>2. Basic C Programs</td>
<td></td>
</tr>
<tr>
<td>a. Arithmetic Operations</td>
<td></td>
</tr>
<tr>
<td>b. Area and Circumference of a circle</td>
<td></td>
</tr>
<tr>
<td>c. Swapping with and without Temporary Variables</td>
<td></td>
</tr>
<tr>
<td>3. Programs using Branching statements</td>
<td></td>
</tr>
<tr>
<td>a. To check the number as Odd or Even</td>
<td></td>
</tr>
<tr>
<td>b. Greatest of Three Numbers</td>
<td></td>
</tr>
<tr>
<td>c. Counting Vowels</td>
<td></td>
</tr>
<tr>
<td>d. Grading based on Student’s Mark</td>
<td></td>
</tr>
<tr>
<td>4. Programs using Control Structures</td>
<td></td>
</tr>
<tr>
<td>a. Computing Factorial of a number</td>
<td></td>
</tr>
<tr>
<td>b. Fibonacci Series generation</td>
<td></td>
</tr>
<tr>
<td>c. Prime Number Checking</td>
<td></td>
</tr>
<tr>
<td>d. Computing Sum of Digit</td>
<td></td>
</tr>
<tr>
<td>5. Programs using String Operations</td>
<td></td>
</tr>
<tr>
<td>a. Palindrome Checking</td>
<td></td>
</tr>
<tr>
<td>b. Searching and Sorting Names</td>
<td></td>
</tr>
<tr>
<td>6. Programs using Arrays</td>
<td></td>
</tr>
<tr>
<td>a. Sum of ‘n’ numbers</td>
<td></td>
</tr>
<tr>
<td>b. Sorting an Array</td>
<td></td>
</tr>
<tr>
<td>c. Matrix Addition, Subtraction, Multiplication and Transpose</td>
<td></td>
</tr>
<tr>
<td>7. Programs using Functions</td>
<td></td>
</tr>
<tr>
<td>a. Computing nCr</td>
<td></td>
</tr>
<tr>
<td>b. Factorial using Recursion</td>
<td></td>
</tr>
<tr>
<td>c. Call by Value and Call by Reference</td>
<td></td>
</tr>
<tr>
<td>8. Programs using Structure</td>
<td></td>
</tr>
<tr>
<td>a. Student Information System</td>
<td></td>
</tr>
<tr>
<td>b. Employee Pay Slip Generation</td>
<td></td>
</tr>
<tr>
<td>c. Electricity Bill Generation</td>
<td></td>
</tr>
<tr>
<td>9. Programs using Pointers</td>
<td></td>
</tr>
<tr>
<td>a. Pointer and Array</td>
<td></td>
</tr>
<tr>
<td>b. Pointer to function</td>
<td></td>
</tr>
</tbody>
</table>

| Hours: 36 |

Department: Computer Science and Engineering/Information Technology
Programme: B.Tech.
Semester: One / Two
Category: LB
<table>
<thead>
<tr>
<th>c. Pointer to Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Programs using File Operation</td>
</tr>
<tr>
<td>a. Counting No. of Lines, Characters and Black Spaces</td>
</tr>
<tr>
<td>b. Content copy from one file to another</td>
</tr>
<tr>
<td>c. Reading and Writing Data in File</td>
</tr>
</tbody>
</table>

<p>| Total contact Hours: - | Total Tutorials: - | Total Practical Classes: 45 | Total Hours: 45 |</p>
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE103</td>
<td>Basic Electrical and Electronics Engineering Laboratory</td>
<td>-</td>
<td>3</td>
<td>20</td>
</tr>
</tbody>
</table>

**Prerequisite**
- To understand the basic electrical tools and their applications.
- To get trained in using different types of wiring.
- To find faults in electrical lamp and ceiling fan.
- To understand and apply Kirchhoff’s laws to analyze electrical circuits.
- To study the operation of CRO and principle of fiber optic communication.
- To design adder and subtractors.
- To understand the frequency response of RC coupled amplifier.

**Objectives**
- The students get exposure on the basic electrical tools, applications and precautions.
- The students are trained for using different types of wiring for various purposes in domestic and industries.
- The students are taught to find faults in electrical lamp and ceiling fan.
- Will be able to learn and use equipments like Signal Generator, Power Supply and CRO.
- To apply Kirchhoff’s law for simplification of circuits.
- To design combinational circuits.
- To obtain the frequency response of Amplifiers.

**Outcome**

**List of Experiments**

**Electrical Lab**
1. Electrical Safety, Precautions, study of tools and accessories.
2. Practices of different joints.
3. Wiring and testing of series and parallel lamp circuits.
4. Staircase wiring.
5. Doctor’s room wiring.
7. Go down wiring.
8. Wiring and testing a ceiling fan and fluorescent lamp circuit.
9. Study of different types of fuses and A.C. and D.C. meters.

**Electronics and Communication Lab**
2. Study of Fiber Optic Communication.
4. Zener Diode as Voltage Regulator.
5. Design of Adder and Subtractor Circuits.

**Total contact Hours:** -  |  **Total Tutorials:** -  |  **Total Practical Classes:** 45  |  **Total Hours:** 45
# Mathematics II

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA102</td>
<td>Mathematics II</td>
<td>3 L 1 T</td>
<td>4 C</td>
<td>40 60 100</td>
</tr>
</tbody>
</table>

**Prerequisite**

- To acquaint with theory of Matrices
- Hyperbolic functions and theory of equations
- Vector calculus and statistics

**Objectives**

- Understands Matrix theory
- Solving techniques of equations
- Understands Vectors and statistics

**Outcome**

- Understands Matrix theory
- Solving techniques of equations
- Understands Vectors and statistics

## UNIT – I  Matrix Theory

Eigen values and Eigen vectors of a real matrix, Characteristic equation, Properties of Eigen values. Cayley-Hamilton Theorem, Diagonalisation of matrices. Reduction of a quadratic form to canonical form by orthogonal transformation and nature of quadratic forms.

## UNIT – II  Trigonometry and Theory of Equations

Trigonometry: Hyperbolic and circular functions, logarithms of complex number, resolving real and imaginary parts of a complex quantity.

Theory of equations: Relation between roots and coefficients, reciprocal equations, transformation of equations and diminishing the roots.

## UNIT – III  Finite Differences

Finite differences: Definitions and relation between operators ($\Delta, \nabla, \delta, E, \mu, D$), Solution of difference Equations, Solving Boundary value problems for ordinary differential equations using finite difference method.

## UNIT – IV  Vector Analysis

Gradient, divergence and curl, their properties and relations. Stoke’s theorem and Gauss divergence theorem (without proof). Simple applications involving cubes, sphere and rectangular parallelepipeds.

## UNIT – V  Statistics

Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

**Total contact Hours:** 48  
**Total Tutorials:** 12  
**Total Practical Classes:** -  
**Total Hours:** 60

**Text Books:**


**Reference Books:**

### Department: Physics  
#### Programme: B.Tech.

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH102</td>
<td>Material Science</td>
<td>L T P C CA SE TM</td>
<td>4</td>
<td>40 60 100</td>
</tr>
</tbody>
</table>

#### Prerequisite

- To impart knowledge to the Engineering students about the significance of Materials Science and its contribution to Engineering and Technology
- To introduce the Physical concepts and properties of Different category of materials and their modern applications in day-to-day life.

#### Objectives

- Engineering Students would have gained fundamental knowledge about the various types of materials and their applications to Engineering and Technology.

#### Outcome

- To introduce the Physical concepts and properties of Different category of materials and their modern applications in day-to-day life.

### UNIT – I  
#### Dielectric Materials  
**Hours: 12**

NLO materials and piezoelectric actuators (introductory concepts).

### UNIT – II  
#### Magnetic Materials and Superconductors  
**Hours: 12**


**Superconductors**: Basic concepts – properties of superconductors – Meissner effect – Type I and II superconductors – BCS theory (qualitative) - High Temperature Superconductors– Qualitative ideas of Josephson effect, quantum interference and SQUID – their applications.

### UNIT – III  
#### Semiconductors  
**Hours: 12**


### UNIT – IV  
#### Nuclear Reactors and Materials  
**Hours: 12**


Nuclear fusion reactions for fusion reactors-D-D and D-T reactions, Basic principles of Nuclear Fusion reactors

### UNIT – V  
#### Smart Materials and Nanomaterials  
**Hours: 12**


Shape Memory alloys (SMA): One way and two way Shape memory effect, pseudoelasticity, Properties and applications of SMA- features of Ni-Ti SMA alloy.

Liquid Crystals : Types – nematic, cholesteric, smectic- Application to Display Devices

Metallic Glasses: preparation by melt spinning. properties and applications

Nanomaterials : Introduction to Nano materials–Methods of synthesis (CVD, Laser Ablation, Solgel, Ball-milling Techniques), Properties and applications of nanomaterials.

C_{60}-Buck Minister Fullerenes, carbon nanotubes– synthesis (Plasma arc, Pulsed Laser evaporation methods) Properties and applications.

### Total contact Hours: 60  
**Total Tutorials:**  
**Total Practical Classes:**  
**Total Hours:** 60

#### Text Books:


#### Reference Books:

Department: Chemistry  
Programme: B.Tech.

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours/Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CY102</td>
<td>Environmental Science</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Prerequisite

- To widen the knowledge of environmental awareness and pollution
- To educate the importance of preserving the earth’s resources and ecosystem
- To highlight the modern techniques and regulations to monitor and control pollution

Objectives

- Students will be able to understand about the environment and natural resources we are blessed with.
- Students will become aware of environmental issues like pollution, dwindling natural resources and degrading ecosystem.
- Students will be inspired to act as environmentally friendly and work for sustainable development of the humanity.

Outcome


UNIT – I  
Ecosystem and Biodiversity  
Hours: 12

UNIT – II  
Air Pollution  
Hours: 12

UNIT – III  
Water and Land Pollution  
Hours: 12

UNIT – IV  
Instrumental Pollution Monitoring  
Hours: 12

UNIT – V  
Energy and Environment  
Hours: 12

Text Books:

1. Anubha Kaushik and C.P. Kaushik, Environmental Science and Engineering, New Age International (P) Ltd, New Delhi, 2009. (Unit I)
2. S.S. Dara, A Text Book of Environmental Chemistry and Pollution Control, S. Chand and Company Ltd, New Delhi, 2008. (Unit II, III, & V)
3. C.N. Sawyer, P.L. McCarty And G.F. Parkin, Chemistry for Environmental Engineering and Science, Tata

Reference Books:

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE101</td>
<td>Basic Civil and Mechanical Engineering</td>
<td>4</td>
<td>40</td>
<td>60</td>
</tr>
</tbody>
</table>

### Prerequisite
- To be able to differentiate the types of buildings according to national building code.
- To understand building components and their functions as well as different types of roads, bridges and dams
- To convey the basics of Mechanical Engineering
- To establish the necessity of basics of Mechanical Engineering to other engineering disciplines
- To explain the concepts of thermal plants used in power systems being a common issue
- To narrate the methods of harnessing renewable energies and their working principles
- To explain the role of basic manufacturing processes
- To develop an intuitive understanding of underlying working principles of mechanical machines and systems.

### Objectives
- Parallels are drawn between the subject and the student’s everyday experience so that this course may be related to what the students already know.
- Students are made to understand the principles of Mechanical Engineering based on theories.
- Students are encouraged to make engineering judgments, to conduct independent exploration of topic of renewable energy systems and to communicate the findings in a professional manner.
- Students are made to develop natural curiosity to explore the various facets of mechanical equipment and machines.
- While emphasizing basic principles, students are provided with explanations used in real time engineering systems.

### Outcome
- To explain the concepts of thermal plants used in power systems being a common issue
- To narrate the methods of harnessing renewable energies and their working principles
- To explain the role of basic manufacturing processes
- To develop an intuitive understanding of underlying working principles of mechanical machines and systems.

### UNIT – I Buildings and Building Materials Hours: 10
Buildings-Definition-NBC Classification - plinth area, floor area, carpet area, floor space index-construction materials—stone, brick, cement, cement-mortar, concrete, steel— their properties and uses. Impact of manufacture and use of building materials on the environment.

### UNIT – II Buildings and their Components Hours: 10

### UNIT – III Basic Infrastructure Hours: 10

### UNIT – IV IC engines – Classification – Working principles - Diesel and petrol engines: two stroke and four stroke engines – Merits and demerits. Steam generators (Boilers) – Classification – Constructional features (of only low pressure boilers) – Boiler mountings and accessories – Merits and demerits - Applications.


### UNIT – VI Hours: 10
Machines: Lathe – Drilling machine – Grinding machine (Description only)

<table>
<thead>
<tr>
<th>Total contact Hours: 60</th>
<th>Total Tutorials: -</th>
<th>Total Practical Classes: -</th>
<th>Total Hours: 60</th>
</tr>
</thead>
</table>

Text Books:

Reference Books:

Web sites:
1. http://nptel.iitm.ac.in/courses/Webcourse-contents/
**Department:** Civil Engineering  
**Programme:** B.Tech.  
**Semester:** One / Two  
**Category:** TB

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE101</td>
<td>Engineering Mechanics</td>
<td>3 1 - - 4</td>
<td>40 60 100</td>
<td></td>
</tr>
</tbody>
</table>

**Prerequisite:** -

**Objectives:**
- To explain the importance of mechanics in the context of engineering.
- To understand the static equilibrium of particles and rigid bodies in two dimensions
- To introduce the techniques for analyzing the forces in the bodies.
- To study the motion of a body and to write the dynamic equilibrium equation.

**Outcome:**
- On successful completion of the course, a student would be able to identify and analyze the problems by applying the principles of engineering mechanics, and to proceed to advanced study on mechanical systems.

**UNIT – I**  
**Fundamentals of Mechanics**  
Hours: 09


**UNIT – II**  
**Application of Force System**  
Hours: 09

Types loads and supports – simply supported beams, cantilever beams and plane trusses – reactions (Introduction only).
Friction: Laws of friction, Static dry friction, simple contact friction problems, body on inclined planes, ladders, wedges, simple screw jack.

**UNIT – III**  
**Properties of Surfaces**  
Hours: 09

Properties of sections – centroids, center of gravity, area moment of inertia, product moment of inertia, polar moment of inertia, radius of gyration, mass moment of inertia.
Principle of virtual work – work done – application to simple structural arrangements.

**UNIT – IV**  
**Kinematics and Kinetics of Particles**  
Hours: 09


**UNIT – V**  
**Kinematics and Kinetics of Rigid Bodies**  
Hours: 09


**Text Books:**

**Reference Books:**
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS101</td>
<td>Communicative English</td>
<td>4</td>
<td>-</td>
<td>4</td>
</tr>
</tbody>
</table>

**Prerequisite**
- 

**Objectives**
- To improve the LSRW skills of I. B.Tech students
- To instill confidence and enable the students to communicate with ease
- To equip the students with the necessary skills and develop their language prowess

**Outcome**
- On successful completion of the module students should be able to:
  - communicate effectively in English
  - get rid of their inhibitions
  - possess effective language skills
  - improve their career prospects

**UNIT – I Basic Concepts of Communicative English**
- Hours: 12

**UNIT – II Comprehension and Analysis**
- Hours: 12

**UNIT – III Writing**
- Hours: 12

**UNIT – IV Oral Communication**
- Hours: 12

**UNIT – V Vocabulary and Language Through Literature**
- Hours: 12
  - Analysis of
    1. “English in India”, R.K. Narayan
    3. “Politics and the English Language”, George Orwell

**Text Books:**

**Reference Books:**
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH103</td>
<td>Physics Laboratory</td>
<td>-</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**Prerequisite**: -

**Objectives**
- To provide a practical understanding of some of the concepts learnt in the theory course on Physics and Materials Science.

**Outcome**
- The Students would have gained practical experience about some of the Theoretical concepts learnt in the Physics and Materials Science courses.

**List of Experiments:**
(Any 10 experiments including a maximum of 2 Demonstration experiments are to be performed.)

1. Radius of curvature of a Lens - Newton’s rings
2. Thickness of a thin object by Air – wedge
3. Spectrometer – Resolving power of a Prism
4. Spectrometer – Resolving power of a Transmission grating
5. Determination of wavelength of a Laser source using transmission grating, reflection grating (vernier calipers) & particle size determination
6. Determination of numerical aperture & Acceptance angle of an optical fiber.
7. Laurent’s Half shade polarimeter – Determination of specific rotatory power*
8. Spectrometer - Hollow prism / Ordinary & Extraordinary rays by Calcite Prism*
9. Determination of optical absorption coefficient of materials using laser*
10. Coefficient of Thermal conductivity - Radial flow method
11. Coefficient of Thermal conductivity – Lee’s Disc method
12. Jolly’s Bulb Apparatus experiment – determination of α
13. Magnetism: I – H curve
14. Field along the axis of a coil carrying current
15. Vibration magnetometer – calculation of magnetic moment & pole strength
16. Electrical conductivity of semiconductor – two probe / four probe method*
17. Hall effect in a semiconductor*
18. Michelson’s Interferometer*

*Demonstration Experiments.

**Total contact Hours**: -
**Total Tutorials**: -
**Total Practical Classes**: 45
**Total Hours**: 45

**Reference Book:**
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CY103</td>
<td>Chemistry Laboratory</td>
<td>-</td>
<td>-</td>
<td>60</td>
</tr>
</tbody>
</table>

**Prerequisite**

- To educate the principles involved in chemical analysis.
- To provide practical knowledge of handling chemicals and chemical analysis.
- To understand the importance of chemical analysis in various fields.

**Objectives**

- Students will be able to understand chemical analysis and its usefulness in engineering, industry and other fields.
- Students will gain laboratory skills and that will give confidence in analyzing samples in engineering, industry and other fields.
- Students will gain knowledge about the principles and methods of listed methods of quantitative analyses.

**List of experiments: (Any 10 experiments)**

1. Determination of total, permanent and temporary hardness of water by EDTA method.
2. Determination of magnesium in water by complexometry.
3. Determination of calcium in lime stone by complexometry.
4. Determination of alkalinity of water.
5. Determination of percentage of acetic acid in vinegar.
6. Determination of ferrous ion in Mohr’s salt.
7. Determination of lead dioxide by permanganometry.
8. Determination of ferrous and ferric ions in a solution by dichrometry.
10. Determination of dissolved oxygen in water.
11. Determination of COD of water sample.
12. Determination of available chlorine in bleaching powder.
13. Determination of chloride content in water by argentometry.
14. Determination of lead in polluted water by conductometry.
15. Preparation of potash alum from scrap aluminium.

**Text Books:**


**Reference Books:**

Department: Mechanical Engineering  
Programme: B.Tech.  
Semester: One / Two  
Category: LB  

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME103</td>
<td>Workshop Practice</td>
<td>-</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
<th>CA</th>
<th>SE</th>
<th>TM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>60</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

Prerequisite:
- To convey the basics of mechanical tools used in engineering
- To establish hands on experience on the working tools
- To develop basic joints and fittings using the hand tools
- To establish the importance of joints and fitting in engineering applications
- To explain the role of basic workshop in engineering
- To develop an intuitive understanding of underlying physical mechanism used in mechanical machines.

Objectives:
- Parallels are drawn between the subject and the student’s everyday experience so that this course may be related to what the students already know.
- Students are introduced to basic hand tools used in various mechanical cutting operations.
- Students are encouraged to make simple joints and fittings.
- Students are made to develop natural curiosity to explore the various facets of basic cutting operations.
- While emphasizing basic operations, students are provided with modern hand tools to use in real time engineering jobs.
- Students are exposed to make objects like tray, welded joints.

Outcome:

UNIT – I  
Fitting  
Hours: 11  
1. Study of tools and Machineries  
2. Symmetric fitting  
3. Acute angle fitting  
4. Obtuse angle fitting  

UNIT – II  
Welding  
Hours: 11  
1. Study of arc and gas welding equipment and tools  
2. Simple lap welding (Arc)  
3. Single V butt welding (Arc)  
4. Corner joint (Arc)  

UNIT – III  
Sheet Metal  
Hours: 11  
1. Study of tools and machineries  
2. Funnel  
3. Waste collection tray  
4. Rectangular Box  

UNIT – IV  
Carpentry  
Hours: 12  
1. Study of tools and machineries  
2. Half lap joint  
3. Corner mortise joint  
4. Dovetail joint  

Text Books:

Web sites: