



**FACULTY OF ENGINEERING**  
**IASE Deemed University**  
Gandhi Vidya Mandir  
Sardarshahr (Rajasthan) – 331401  
INDIA

**Teaching and Examination Scheme and Syllabus**  
for  
**BACHELOR OF TECHNOLOGY**  
**(Four-Year Full Time Degree Programme)**  
**First Year (Common for All Branches)**  
**(SEMESTER SCHEME)**

**Session 2015-16**

## **RULES AND GUIDELINES FOR THE STUDENTS**

**1. The Bachelor of Technology course is a four year (Eight Semester) full time integrated degree programme.**

### **2. ELIGIBILITY for Admission**

A candidate seeking admission to the first year of the Bachelor of Technology course shall be required to have passed 10+2 examination in Science with Physics, Chemistry and Mathematics/Biology from any board recognized by Rajasthan Board of Secondary Education, Rajasthan with at least 45% marks in aggregate for general category candidates, and 40% for SC/ST/OBC candidates.

### **3. ADMISSION procedure**

Admission to the first year B.Tech course shall be made on the basis of marks scored by the candidates in his/her 10+2 examination.

### **4. THE PROGRAMME**

The Bachelor of Technology is a four year (Eight semesters) full time degree program .The course structure and program administration are as follows.

### **5. COURSE STRUCTURE**

The First Year (I and II Semesters) comprises of Theory (Lectures and Tutorials) and Practicals/Sessionals (Laboratory work, Engineering Graphics, Workshop Practice and Project etc.). Examination will be held at the end of the each semester. Details of these are given in the Teaching & Examination Scheme.

### **6. PROGRAMME ADMINISTRATION**

#### **6.1 Medium of Instruction**

English shall be the medium of instruction and examination.

#### **6.2 EVALUATION**

**(a)** Each subject will be evaluated through a theory paper at the end of the semester carrying 80 marks along with continuous evaluation of sessional work, carrying 20 marks. The theory paper shall be of three hour duration. The sessional work will consist of continuous assessment of student's performance by teachers in tutorial classes, and class tests.

**(b)** Three class tests will be organized in each semester as per the scheme. The higher two out of the marks scored in the three tests will be considered for the sessional marks.

**(c)** Evaluation of laboratory practical work and Engineering Graphics (Drawing) will be through continuous assessment throughout the semester as well as examination at the end of the semester.

### **7. Promotion**

**7.1** The maximum span period of a program is eight years from the date of registration in the program.

**7.2** The minimum grade for passing the examination for each semester shall be "**P**" of all the subjects (theory, sessional) of the semester.

**7.3** A student will be permitted to attend the classes of the second semester immediately after the

examination of the first semester examination, as the case may be, provided he/she has appeared in the first semester examination.

**7.4** To be eligible for promotion to the 3<sup>rd</sup> semester of the program a student must have successfully cleared at least 50% of total subjects including practicals of the first and second semesters taken together. In case of 50% of total number of papers is fractional number, the candidate must have cleared number of papers next higher number of the fraction so obtained.

**7.5** A student promoted to the third semester, without having cleared all the papers, will have to appear and pass the backlog papers of the first semester along with the regular examination of the first semester and backlog papers of the second semester along with the regular examination of the second semesters.

**7.6 (a) Award of Grade:**

- **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
- **Choice Based Credit System (CBCS):** The CBCS provides choice for students to select from the prescribed courses (core, elective courses).
- **Course:** Usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course has been designed to comprise lectures/ tutorials/laboratory work/ field work/ outreach activities/ project work/ vocational training/viva/seminars/term papers/assignments/presentations/self-study etc. or a combination of some of these.
- **Credit Based Semester System (CBSS):** Under the CBSS, the requirement for awarding a degree is prescribed in terms of number of credits to be completed by the students.
- **Credit Point:** It is the product of grade point and number of credits for a course.
- **Credit:** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
- **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all the semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.
- **Grade Point:** It is a numerical weight allotted to each letter grade on a 10-point scale.
- **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Letter Grade	% Scale	Grade Point
O (Outstanding)	85% and Above	10
A+(Excellent)	75% to 84.99%	9

A(Very Good)	65% to 74.99%	8
B+(Good)	55% to 64.99%	7
B(Above Average)	50% to 54.99%	6
C(Average)	45% to 49.99%	5
P (Pass)	40% to 44.99%	4
F(Fail)	Less than 40%	0
Ab (Absent)	0 %	0

- **Programme:** An educational programme leading to award of a Degree.
- **Semester Grade Point Average (SGPA):** It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
- **Semester:** Each semester will consist of 13-18 weeks of academic work equivalent to 90 teaching days. The odd semester may be scheduled from July to December and even semester from January to June.
- **Transcript or Grade Card or Certificate:** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

**7.7** If a student (who has successfully completed the programme) wishes to reappear in one or more theory papers of the first, second, third, fourth, fifth, sixth, seventh or eighth semesters for the purpose of improving his/her grade, he/she will be permitted to do so on payment of requisite examination fee along with the regular examinations of that semester; however, the total number of such attempts shall not exceed four theory papers during the span period of the programme. For this his/her previous performance in the paper/papers concerned shall be treated as cancelled. The application for such reappearing/re-examination must be submitted before the next examination of the corresponding semester. However, such candidates shall not be considered for award of gold medal.

**8. Attendance:** All students are required to have 75% attendance in each subject and there must be 75% attendance of the student before he/she could be permitted to appear in the examination.

**TEACHING & EXAMINATION SCHEME  
FOR B.TECH- FOUR YEAR (8 SEMESTER) FULL TIME DEGREE**

**B.TECH FIRST YEAR (COMMON FOR ALL BRANCHES)**

**SEMESTER: I**

Subject Code	Title	Hrs. / Week			Credit	IA		Exam		Total
		L	T	P		T	P	T	P	
BT 101	Communicative English	2	-	-	2	20	-	80	-	100
BT 102	Engineering Mathematics-I	3	1	-	4	20	-	80	-	100
BT 103/103-P	Engineering Physics-I	3	1	2	5	20	30	80	20	150
BT 104/104-P	Engineering Chemistry	4	-	2	5	20	30	80	20	150
BT 105/105-P	Basic Electrical Engineering	2	1	2	4	20	30	80	20	150
BT 106/106-P	Basic Electronics Engineering	2	1	2	4	20	30	80	20	150
BT 107-P	Practical Geometry	-	-	3	1.5	-	45	-	30	75
BT 108-P	Workshop Practice	-	-	3	1.5	-	45	-	30	75
BT 109	Discipline & Extra Curricular Activity									50
Total		16	4	14	27					1000

**SEMESTER: II**

Subject Code	Title	Hrs. / Week			Credit	IA		Exam		Total
		L	T	P		T	P	T	P	
BT 201/201-P	Communication Techniques	2	-	2	3	20	30	80	20	150
BT 202	Engineering Mathematics-II	3	1	-	4	20	-	80	-	100
BT 203/203-P	Engineering Physics-II	3	1	2	5	20	30	80	20	150
BT 204	Engineering Mechanics	3	1	-	4	20	-	80	-	100
BT 205/205-P	Fundamentals of Computer Programming	2	-	2	3	20	30	80	20	150
BT 206	Environmental Studies & Disaster Management	2	-	-	2	20	-	80	-	100
BT 207/207-P	Basic Mechanical Engineering	3	-	3	4.5	20	30	80	20	150
BT 208-P	Machine Drawing	-	-	3	1.5	-	30	-	20	50
BT 209	Discipline & Extra Curricular Activity									50
Total		19	3	12	27					1000

**IA- Internal Assessment**

**L- Lecture**

**T- Tutorial**

**P- Practical**

## 101 COMMUNICATIVE ENGLISH

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Grammar</b> <ol style="list-style-type: none"> <li>1. Tenses</li> <li>2. Active and Passive Voice</li> <li>3. Direct &amp; Indirect Speech</li> <li>4. Conditional Sentences, Modal Verbs</li> </ol>	<b>8</b>
<b>II</b>	<b>Composition</b> <ol style="list-style-type: none"> <li>1. Dialogue Writing</li> <li>2. Paragraph and Precis Writing Report, Report Writing</li> </ol>	<b>8</b>
<b>III</b>	<b>Short Stories</b> <ol style="list-style-type: none"> <li>1. The Luncheon: W.S. Maugham</li> <li>2. How Much Land Does a Man Need?: Leo Tolstoy</li> <li>3. The Last Leaf: O. Henry</li> </ol>	<b>8</b>
<b>IV</b>	<b>Essays</b> <ol style="list-style-type: none"> <li>1. On the Rule of the Road: A. G. Gardiner</li> <li>2. The Gandhian Outlook: S. Radhakrishnan</li> <li>3. Our Own Civilisation: C.E.M. Joad</li> </ol>	<b>8</b>
<b>V</b>	<b>Poems</b> <ol style="list-style-type: none"> <li>1. The Unknown Citizen: W. H. Auden</li> <li>2. The Character of A Happy Life: Sir Henry Wotton</li> <li>3. No Men are Foreign: James Kirkup</li> <li>4. If : Rudyard Kipling</li> </ol>	<b>8</b>

### Text/ Reference Books:

- Communication Skills for Engineers and Scientists; Sangeeta Sharma & Binod Mishra; PHI Learning Pvt. Ltd.
- English for Engineers: Made Easy; Aeda Abidi & Ritu Chaudhary; Cengage Learning, (New Delhi)
- A Practical Course for Developing Writing Skills in English; J.K. Gangal, PHI Learning Pvt. Ltd.; New Delhi.
- Intermediate Grammar, Usage and Composition; Tickoo, A. E. Subramaniam & P. R. Subramaniam; Orient Longman (New Delhi)
- The Written Word ; Vandana R. Singh; Oxford University Press (New Delhi)
- The Great Short Stories edited by D.C. Datta; Ram Narain Lal Publishers (Allahabad)
- Professional Communication; Kavita Tyagi & Padma Misra, PHI Learning Pvt. Ltd.; New Delhi.
- “Learn Correct English: Grammar; Usage and Composition” by Shiv K. Kumar & Hemalatha Nagarajan; Pearson (New Delhi).
- “Current English Grammar and Usage with Composition” by R.P. Sinha; Oxford University Press (New Delhi).
- “Grammar of the Modern English Language”, by Sukhdev Singh & Balbir Singh; Foundation Books (New Delhi).

## BT 102- ENGINEERING MATHEMATICS-I

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Differential Calculus</b> Asymptotes and Curvature (Cartesian Coordinates Only) Concavity, Convexity and Point of Inflexion (Cartesian Coordinates Only) Curve Tracing (Cartesian and Standard Polar Curves – Cardioids, Lemniscates of Bernoulli, Limacon, Equiangular Spiral)	<b>8</b>
<b>II</b>	<b>Differential Calculus</b> Partial Differentiation, Euler’s Theorem on Homogeneous Functions Approximate Calculations Maxima & Minima of Two and More Independent Variables Lagrange’s Method of Multipliers	<b>8</b>
<b>III</b>	<b>Integral Calculus</b> Applications in Finding the Length of Simple Curves Surface and Volumes of Solids of Revolution Double Integral, Areas & Volumes by Double Integration Change of Order of Integration Beta Function and Gamma Function (Simple Properties)	<b>8</b>
<b>IV</b>	<b>Differential Equations</b> Differential Equations of First Order and First Degree – Variable Separable, Homogeneous Forms, Reducible to Homogeneous Form, Linear Form, Exact Form, Reducible to Exact Form Linear Differential Equations of Higher Order with Constant Coefficients Only	<b>8</b>
<b>V</b>	<b>Differential Equations</b> Second Order Ordinary Differential Equations with Variable Coefficients Homogeneous and Exact Forms Change of Dependent Variable Change of Independent Variable, Normal Forms Method of Variation of Parameter	<b>8</b>

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Advanced Engineering Mathematics; Erwin Kreyszig; Wiley 9th Edition.</li> <li>• Calculus and Analytical Geometry; Thomas and Finney; Narosa Publishing House. New Delhi.</li> <li>• A Text Book of Differential Equations; M.Ray and Chaturvedi; Students Friends &amp; Co. Publisher, Agra.</li> <li>• Higher Engineering Mathematics; B.V.Ramana; Tata McGraw Hill.</li> <li>• Thomas Calculus; Maurice D. Weir, Joel Hass and others; Pearson, 11<sup>th</sup> Edition.</li> <li>• Differential Calculus; Gorakh Prasad; Pothi Sala Pvt. Ltd.</li> <li>• Integral Calculus; Gorakh Prasad; Pothi Sala Pvt. Ltd.</li> </ul>

## BT 103 ENGINEERING PHYSICS-I

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Interference of light</b> <ul style="list-style-type: none"> <li>• Michelson's Interferometer: Production of circular &amp; straight line fringes, Determination of wavelength of light. Determination of wavelength separation of two nearby wavelengths.</li> <li>• Newton's rings and measurement of wavelength of light.</li> <li>• Interference of Optical technology: elementary idea of anti-reflection coating and interference filters.</li> </ul>	<b>8</b>
<b>II</b>	<b>Polarization of light</b> <ul style="list-style-type: none"> <li>• Plane circular and elliptically polarized light on the basis of electric (light) vector, Malus law.</li> <li>• Double Refraction: Qualitative description of double refraction phase retardation plates, quarter and half wave plates, construction, working and use of these in production and detection of circular and elliptically polarized light.</li> <li>• Optical Activity: Optical activity and law of optical rotation, specific rotation and its measurement using the half-shade and bi-quartz device.</li> </ul>	<b>8</b>
<b>III</b>	<b>Diffraction of light</b> <ul style="list-style-type: none"> <li>• Single slit diffraction: Quantitative description of single slit, position of maxima / minima and width of central maximum, intensity variation.</li> <li>• Diffraction Grating: Construction and theory. Formation of spectrum by plane transmission grating, Determination of wavelength of light using plane transmission grating.</li> <li>• Resolving power: Geometrical &amp; Spectral, Raleigh criterion, Resolving power of diffraction grating,</li> </ul>	<b>8</b>
<b>IV</b>	<b>Elements of Material Science</b> <ul style="list-style-type: none"> <li>• Bonding in Solids: Covalent bonding and Metallic bonding.</li> <li>• Classification of Solids as Insulators, Semiconductors and Conductors.</li> <li>• Semiconductors: Conductivity in Semiconductors, Determination of Energy gap of Semiconductor.</li> <li>• X-Ray diffraction and Bragg's Law.</li> <li>• Hall Effect: Theory, Hall Coefficient and applications.</li> </ul>	<b>8</b>
<b>V</b>	<b>Special Theory of Relativity</b> <ul style="list-style-type: none"> <li>• Postulates of special theory of relativity, Lorentz transformations, relativity of length, mass and time.</li> <li>• Relativistic velocity addition, mass-energy relation.</li> <li>• Relativistic Energy and momentum.</li> </ul>	<b>8</b>

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Fundamental of Optics; Jenkins and White; Fourth Edition; McGraw Hill.</li> <li>• Optics; Ajoy Ghatak; Third Edition, Tata McGraw Hill.</li> <li>• Concept of Modern Physics; A. Baiser; Fifth Edition, McGraw Hill.</li> <li>• Modern Physics; J. Morrison; Edition 2011, Elsevier.</li> <li>• Elements of Material Science and Engineering; Van Vlack; Sixth Edition, Pearson.</li> <li>• Solid State Physics; S.O.Pillai; New Age International</li> </ul>

## BT 103-P BASIC ENGINEERING PHYSICS LAB-I

1	To determine the wave length of monochromatic light with the help of Fresnel's biprism.
2	To determine the wave length of sodium light by Newton's Ring.
3	To determine the specific rotation of Glucose (Sugar) solution using a polarimeter.
4	To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
5	To convert a Galvanometer in to an ammeter of range 1.5 amp. and calibrate it.
6	To convert a Galvanometer in to a voltmeter of range 1.5 volt and calibrate it.
7	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.
8	To study the variation of thermo e.m.f. of iron copper thermo couple with temperature.
9	To determine coherent length and coherent time of laser using He-Ne Laser.



## BT 104 ENGINEERING CHEMISTRY

UNIT	CONTENTS	CONTACT HOURS
I	<p><b>General Aspects of Fuel:</b> Organic fuels, Origin, classification and general aspects of fossil fuels. Solid fuels, Coal, carbonization of coal, manufacturing of coke by Beehive oven and by product oven method. Liquid fuels, Composition of petroleum, advantages and refining of petroleum. Cracking, reforming, polymerization and isomerization of refinery products. Synthetic petrol, Bergius and Fischer Tropsch process. Knocking, octane number and anti-knocking agents. Gaseous fuels, Advantages, manufacturing, composition and calorific value of coal, gas and oil gas.</p> <p><b>Fuels Analyses:</b> Ultimate and proximate analysis of coal, Determination of calorific value of solid and gaseous fuels by bomb and Junker's Calorimeter respectively. Calculations of calorific value based on Dulong's formula. Combustion, requirement of oxygen/ air in combustion process. Flue gas analysis by Orsat's apparatus and its significance.</p>	8
II	<p><b>Water:</b> Common Impurities of water Hardness of water, Determination of hardness by Clark's test and complexometric (EDTA) method, Numerical based on hardness and EDTA method, Municipal Water Supply: Requisites of potable water, Steps involved in purification of water, Sedimentation, coagulation, Filtration and Sterilization, Break point chlorination.</p> <p><b>Water Treatment:</b> Softening of water, Lime-Soda, Permutit (Zeolite) and Deionization (Demineralization) methods, Boiler troubles their causes, disadvantages and prevention: Formation of solids (Scale and Sludge), Carry over (Priming and Foaming), Corrosion and Caustic, Embrittlement. Numerical problems based on Lime-Soda and Zeolite softening methods.</p>	8
III	<p><b>Polymers:</b> Different methods of classification, basic ideas of polymerization mechanisms. Elastomers: Natural rubber, vulcanization, Synthetic Rubbers viz. Buna-S, Buna-N, Butyl and neoprene rubbers.</p> <p><b>New Engineering Materials:</b> Fullerenes: Introduction, properties, preparation and uses. Organic Electronic Materials (including conducting polymers- poly (p-phenylene), polythiophenes, Polyphenylene, vinylenes, polypyrroles, polyaniline).</p>	8
IV	<p><b>Cement:</b> Definition, Composition, basic constituents and their significance, Manufacturing of Portland cement by Rotary Kiln Technology, Chemistry of setting and hardening of cement and role of gypsum.</p> <p><b>Glass:</b> Definition, Properties, Manufacturing of glass and importance of annealing in glass making, Types of silicate glasses and their commercial uses, Optical fiber grade glass.</p>	8
V	<p><b>Refractory:</b> Definition, classification, properties, Requisites of good refractory and manufacturing of refractory. Preparation of Silica and fire clay refractory with their uses. Seger's (Pyrometric) Cone Test and RUL Test</p> <p><b>Lubricants:</b> Introduction, classification and uses of lubricants. Types of lubrication. Viscosity &amp; viscosity index, flash and fire point, cloud and pour point, steam emulsification number, precipitation number and neutralization number.</p>	8

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• The Chemistry and Technology of Coal, by J G Speigh; CRC Press</li> <li>• The Chemistry and Technology of Petroleum; by J G Speigh; CRC Press</li> <li>• Polymer Chemistry: An Introduction; Malcolm P. Stevens; Oxford University Press</li> <li>• Solid State Chemistry and Its Applications; Anthony R West; John Wiley &amp; Sons</li> <li>• Lubricants and Lubrications; Theo Mang; Wilfeied; Wiley-VCH</li> <li>• Hand Book of Conjugated Polymers; Tejre A Skotheim and J. R. Reynolds; CRC Press</li> </ul>

**BT 104-P BASIC ENGINEERING CHEMISTRY LAB**

1	Proximate analysis of solid fuel.
2	Experiments based on Bomb Calorimeter.
3	To determine the strength of Ferrous Ammonium sulphate solution with the help of $K_2Cr_2O_7$ solution.
4	Determination of Na/K/Ca by flame photometer in a given sample.
5	To determine the flash and fire point of a given lubricating oil.
6	To determine the viscosity of a given lubricating oil by Redwood viscometer.
7	To determine cloud and pour point of a given oil.
8	To determine the hardness of water by EDTA method.
9	Determination of $CO_2$ in a water sample.
10	Measurement of pH of a given sample by pH-meter.
11	To determine free and residual chlorine in a given water sample.
12	Measurement of dissolved oxygen in water.
13	Measurement of conductivity of a given sample by conductivity meter.
14	Evaluation of Reverse Osmosis (RO) Process by TDS measurement.

## BT 105 BASIC ELECTRICAL ENGINEERING

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Basic Concepts of Electrical Engineering:</b> Electric Current, Electromotive force, Electric Power, Ohm's Law, Basic Circuit Components, Faraday's Law of Electromagnetic Induction, Lenz's Law <b>D.C Circuit:</b> Kirchhoff's laws, Network Sources, Resistive Networks, Series-Parallel Circuits, Node Voltage Method, Mesh Current Method, Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorems	<b>8</b>
<b>II</b>	<b>Single Phase AC Circuits:</b> Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. RLC Series, Parallel and Series-Parallel Circuits, Complex Representation of Impedances. Phasor Diagram, Power and Power Factor.	<b>8</b>
<b>III</b>	<b>Three Phase A.C. Circuits:</b> Generation of Three-Phase AC Voltage, Delta and Star-Connection, Line & Phase Quantities, 3-Phase Balanced Circuits, Phasor Diagram, Measurement of Power in Three Phase Balanced Circuits.	<b>8</b>
<b>IV</b>	<b>Transformer:</b> Faraday's Law of Electromagnetic Induction, Construction and Operation of Single Phase Transformer, EMF Equation, Voltage & Current Relationship and Phasor Diagram of Ideal Transformer.	<b>8</b>
<b>V</b>	<b>Rotating Electrical Machines</b> <b>DC Machines:</b> Principle of Operation of DC Machine as Motor and Generator, EMF Equation, Applications of DC Machines. <b>AC Machines:</b> Principle of Operation of 3-Phase Induction Motor, 3-Phase Synchronous Motor and 3- Phase Synchronous Generator (Alternator), Applications of AC Machines. <b>Servo Motor</b> and its Applications	<b>8</b>

### Text/ Reference Books:

- .A Textbook of Electrical Technology : Basic Electrical Engineering, B.L Thereja; S. Chand
- Electrical & Electronics Engineering; Hp Tiwari; College book centre
- Basic Electrical & Electronics Engineering by Van Valkenburge; Cengage learning Indian Edition
- Basic Electrical and Electronics Engineering by Muthusubramaniam; TMH
- Fundamentals of Electrical Engineering by Leonard S. Bobrow; Oxford University Press
- Fundamentals of Electrical and Electronics Engineering by Ghosh, Smarajit; PHI India
- Basic Electrical & Electronics Engineering by Ravish Singh; TMH
- Basic Electronics Engineering by Vijay Baru et al; Dream Tech; New Delhi

## BT 105-P BASIC ELECTRICAL ENGINEERING LAB

1	Study and verification of KCL & KVL for D.C Circuit.
2	Make house wiring including earthing for 1-phase energy meter, MCB, ceiling fan, tube light, three pin socket and a lamp operated from two different positions. Basic functional study of components used in house wiring.
3	Study the construction and basic working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor. Connect ceiling fan along with regulator and single phase induction motor through auto-transformer to run and vary speed.
4	Basic functional study and connection of moving coil & moving iron ammeters and voltmeters, dynamometer, wattmeter and energy meter.
5	Measurement of insulation resistance by meggar.
6	Measurement of Power using 1 watt meter method in D.C Circuit.
5	Study the construction, circuit, working and application of the following lamps: (i) Fluorescent lamp, (ii) Sodium vapour lamp, (iii) Mercury vapour lamp, (iv) Halogen lamp and (v) Neon lamp
6	Study the construction and connection of single phase transformer and auto-transformer. Measure input and output voltage and fin turn ratio.
7	Study the construction of a core type three phase transformer. Perform star and delta connection on a 3-phase transformer and find relation between line and phase voltage.
8	Run a 3-phase squirrel cage induction motor at no load and measure its voltage, current, power and power factor. Reverse the direction of rotation.

## BT 106 BASIC ELECTRONICS ENGINEERING

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>P-N Junction Diodes</b> Intrinsic and extrinsic semiconductors, open circuited p –n junction and space charge region The biased p –n junction and voltage –ampere characteristics, Zener diode.	<b>8</b>
<b>II</b>	<b>Diode Circuits</b> Single phase half wave and bridge rectifiers –peak inverse voltage DC and RMS load currents and voltages, ripple factor, Introduction to filters	<b>8</b>
<b>III</b>	<b>Transistor</b> PNP and NPN transistors, transistor current components, Common emitter Configuration-input output characteristics Transistor operating regions: active region, saturation region and cut off region Transistor as an amplifier and a switch	<b>8</b>
<b>IV</b>	<b>Cathode Ray oscilloscope</b> CRT Construction, Basic CRO circuits, CRO Probes, Oscilloscope Techniques of Measurement of frequency, Phase Angle and Time Delay, Multibeam, multi trace, storage& sampling Oscilloscopes.	<b>8</b>
<b>V</b>	<b>Digital Electronics</b> Digital Electronics: Binary, Octal and Hexadecimal number systems and conversions, Boolean Algebra, Truth tables of logic gates (AND, OR, NOT), NAND, NOR as universal gates, Difference between combinational circuits and sequential circuits.	<b>8</b>

### Text/ Reference Books:

- Electronic Devices & Circuits - Boylstad & Nashelsky.
- Integrated Electronics By Millman & Halkias.
- Electronic Principles – Malvino
- Principles of Electronics – V.K. Mehta, Shalu Melta.
- Electronic Circuits – Donald L. Shilling & Charles Belowl

## BT 106-P BASIC ELECTRONICS ENGINEERING LAB

1	To get familiar with the working knowledge of the following instruments: <ul style="list-style-type: none"> <li>• Cathode ray oscilloscope (CRO)</li> <li>• Multimeter (Analog and Digital)</li> <li>• Function generator</li> <li>• Power supply.</li> </ul>
2	<ul style="list-style-type: none"> <li>• To measure phase difference between two waveforms using CRO.</li> <li>• To measure an unknown frequency from Lissajous figures using CRO.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Plot the forward and reverse V-I characteristics of P-N junction diode.</li> <li>• Calculation of cut-in voltage .</li> <li>• Study of Zener diode in breakdown region.</li> </ul>
4	To plot and study the input and output characteristics of BJT in common-emitter configuration .
5	To plot and study the input and output characteristics of BJT in common-base configuration.
6	Verification of truth tables of logic gates (OR,AND, NOT, NAND, NOR).

## BT 107-P PRACTICAL GEOMETRY

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	(a) Lines, Lettering & Dimension (Sketch Book) (b) Scale-representative Fraction, Plan scale, Diagonal Scale, Vernier scales (In sheet) comparative Scale, & scale of chords (Sketch Book)	<b>8</b>
<b>II</b>	(a) Conic Section:- Construction of Ellipse, Parabola & Hyperbola by different methods (In sheet) (b) Engineering curves:- Construction of cycloid, Epicycloids, Hypocycloid and Involutés (In sheet) Archimedean and Logarithmic spiral, (Sketch book)	<b>8</b>
<b>III</b>	(a) Type of Projection, Orthographic Projection: First Angle and third Angle Projection (Sketch Book) (b) Projection of Points (Sketch Book) (c) Projection of Straight lines, different position of Straight lines, methods for determining True length, true inclinations and Traces of straight lines (Four problems in sheet and three problems in (Sketch Book) (d) Projection of Planes: Different positions of Plane lamina like:- Regular polygon, circle three of planes (Four problems in Drawing sheet and three problems in Sketch Book.)	<b>8</b>
<b>IV</b>	(a) Projection of Solids:- Projection of right and regular Polyhedron, Prisms, Pyramids and cone (Four Problem in Drawing sheet and there in Sketch Book.) (b) Section of Solids:- Projection of Frustum of a cone and pyramid, Projection of Truncated Solids (like Prism, Pyramid, Cylinder and Cone) in different positions.	<b>8</b>
<b>V</b>	(a) Development of Surfaces:- Parallel line and Radial line method for right, regular solids. (b) Isometric Projections:- Isometric Scales, Isometric Axes, Isometric Projection of Solids.	<b>8</b>

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Engineering Drawing; N.D.Bhatt, Charotar Publishing House Pvt. Ltd.</li> <li>• Engineering Drawing Geometrical Drawing - P.S.Gill, S.K.Katara &amp; Sons.</li> <li>• Engineering Drawing; Dhanarajay A Jolhe ;Tata McGraw Hill.</li> <li>• Engineering Drawing; Basant Agarwal &amp; CM Agarwal ;Tata McGraw Hill.</li> <li>• Engineering Drawing; V.Laxminarayanan &amp; M.L. Mathur; Jain rothers, Delhi</li> </ul>

## BT 108-P WORKSHOP PRACTICE

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Carpentry Shop</b> 1. T – Lap joint 2. Bridle joint	<b>8</b>
<b>II</b>	<b>Foundry Shop</b> 1. Mould of any pattern 2. Casting of any simple pattern	<b>8</b>
<b>III</b>	<b>Welding Shop</b> 1. Gas welding practice by students on mild steel flat 2. Lap joint by gas welding 3. MMA welding practice by students 4. Square butt joint by MMA welding 5. Lap joint by MMA welding 6. Demonstration of brazing	<b>8</b>
<b>IV</b>	<b>Machine Shop Practice</b> 1. Job on lathe INVOLVING plain cylindrical turning, step turning, taper turning and chamfering. 2. Demonstration of single start V-thread cutting. 3. Job on shaper for finishing two sides of a job 4. Study of milling machine and milling cutter. Demonstration of Upcut and Downcut milling operation. 5. Demonstration of surface Grinding	<b>8</b>
<b>V</b>	<b>Fitting and Smithy Shop</b> 1. Finishing of two face and edge of a square piece by filing 2. Study of vernier caliper height gauge, micrometer(inside and out side), spirit level 3. Tin smithy for making mechanical joint and soldering of joint 4. To cut a square notch using hacksaw and to drill three holes on PCD and tapping	<b>8</b>

### Text/ Reference Books:

- Mechanical Workshop Practice; K.C. John; PHI Learning New Delhi.
- Elements of Workshop Technology Hajra & Choudhary; Media Promoters & Publisher.
- Workshop Technology ; W.A.J. Chapman; CBS Publisher & Distributor New Delhi.
- Workshop Technology; B.S. Raghvanshi

## BT 109 DISCIPLINE & EXTRA CURRICULAR ACTIVITIES(DECA)

Component – A
The marks shall be deducted from this component for those who shall involve themselves in <b>Indiscipline/Undesirable/Ragging</b> activities or in case of penalty of marks imposed by Standing Disciplinary Committee (SDC) and approved by Head of the Institution concerned subject to a maximum of 25 marks.
Component – B
Marks shall be awarded for the participation of students in various Extra Curricular Activities organised by the University/Department as per the following, subject to a maximum of 25 marks. In case student does not participate in any of the Extra Curricular Activities, he/ she shall be awarded zero (0) marks in DECA - Component B.
<ul style="list-style-type: none"> <li>• National Cadet Corps (NCC).</li> <li>• National Service Scheme (NSS)</li> <li>• Scouts &amp; Guide</li> <li>• Sports Activities</li> <li>• Literary Activities &amp; model</li> <li>• Cultural Activities</li> <li>• Paper Presentation/ Participation in National Conferences/ Seminars/ Workshops etc.</li> <li>• Blood Donation</li> <li>• Participation in activities of College Annual day Celebration</li> <li>• Organising/ Participation/ Volunteer in different activities organised by the departments/ institute</li> <li>• Organising/ Participation in activities of Students Chapters of ISTE, IE (I), IEEE, IETE, Vivekanand Kendra etc.</li> </ul>

**\*These Rules will be applicable for all Semesters**

## BT 201 COMMUNICATION TECHNIQUES

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Elements of Communication</b> <ul style="list-style-type: none"> <li>• Communication: Meaning, Importance and Process</li> <li>• Objectives of Communication</li> <li>• Media and Types of Communication</li> </ul>	<b>8</b>
<b>II</b>	<b>Basics of Communication</b> <ul style="list-style-type: none"> <li>• Verbal and Non-Verbal Communication</li> <li>• Formal and Informal Channels of communication</li> <li>• Qualities of Good Communication</li> </ul>	<b>8</b>
<b>III</b>	<b>Skills of Communication</b> <ul style="list-style-type: none"> <li>• Barriers to Communication</li> <li>• Professional Communication</li> <li>• Interpersonal Communication and methods to improve it</li> </ul>	<b>8</b>
<b>IV</b>	<b>Grammar</b> <ul style="list-style-type: none"> <li>• Subject-Verb Agreement (Concord)</li> <li>• Linking Words (Conjunctions)</li> <li>• Relative Clauses</li> <li>• Common Errors</li> </ul>	<b>8</b>
<b>V</b>	<b>Composition</b> <ul style="list-style-type: none"> <li>• Resume Writing</li> <li>• Business Letter Writing: Sales, Credit, Enquiry, Order, Claim, Complaint, Job Applications, etc.</li> <li>• E-mail messages</li> <li>• Telephone Etiquettes</li> </ul>	<b>8</b>

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Communication Skills for Engineers and Scientists; Sangeeta Sharma and Binod Mishra; PHI Learning Pvt. Ltd.(New Delhi)</li> <li>• English Grammar and Composition; Gurudas Mukherjee; Ane Books Pvt. Ltd.(New Delhi)</li> <li>• Current English Grammar and Usage with Composition; R.P. Sinha; Oxford University Press (New Delhi)</li> <li>• Effective Technical Communication; M Ashraf Rizvi; Tata McGraw Hill (New Delhi)</li> <li>• Business Communication; Meenakshi Raman &amp; Prakash Singh; Oxford University Press (New Delhi)</li> <li>• Professional Communication; Aruna Koneru; Tata McGraw Hills, New Delhi.</li> <li>• A Practical Course for Developing Writing Skills in English; J.K. Gangal; PHI Learning Pvt. Ltd., New Delhi.</li> <li>• “Communicative English for Engineers and Professionals”; by Nitin Bhatnagar &amp; Mamta Bhatnagar; Pearson (New Delhi).</li> <li>• “The Ace of Soft Skills”; by Gopalswamy Ramesh &amp; Mahadevan Ramesh; Pearson (New Delhi)</li> <li>• Delhi)</li> </ul>

## BT 201-P COMMUNICATION TECHNIQUES LAB

1	Phonetic Symbols and Transcriptions
2	Word Formation
3	Affixes
4	Listening and speaking Skills.
5	Words often Mis-spelt and Mis- Pronounced
6	One Word for Many.
7	Synonyms and Antonyms.
8	Seminar Presentation.
9	Group Discussion.
10	Job Interview

## BT 202 ENGINEERING MATHEMATICS-II

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Coordinate Geometry of Three Dimensions</b> <ul style="list-style-type: none"> <li>• Equation of a sphere</li> <li>• Intersection of a sphere and a plane, tangent plane, normal lines</li> <li>• Right circular cone</li> <li>• Right circular cylinder</li> </ul>	<b>8</b>
<b>II</b>	<b>Matrices</b> <ul style="list-style-type: none"> <li>• Rank of a matrix, inverse of a matrix by elementary transformations</li> <li>• Solution of simultaneous linear equations</li> <li>• Eigen values and Eigen vectors, Cayley – Hamilton theorem (without proof)</li> <li>• Diagonalization of matrix</li> </ul>	<b>8</b>
<b>III</b>	<b>Vector Calculus</b> <ul style="list-style-type: none"> <li>• Scalar and vector field, differentiation &amp; integration of vector functions</li> <li>• Gradient, Divergence, Curl and Differential Operator</li> <li>• Line, Surface and volume Integrals</li> <li>• Green's Theorem in a Plane, Gauss' and Stoke's Theorem (without proof) and their Applications</li> </ul>	<b>8</b>
<b>IV</b>	<b>Dynamics</b> <ul style="list-style-type: none"> <li>• Angular Motion, Radial and Transverse Velocities and Accelerations</li> <li>• Tangential and Normal Accelerations</li> <li>• Rectilinear Motion in Resisting Medium</li> </ul>	<b>8</b>
<b>V</b>	<b>Differential Equations</b> <ul style="list-style-type: none"> <li>• Series Solutions of Second Order Linear Differential Equations with Variable Coefficients (Complementary Functions only)</li> <li>• Partial Differential Equations of First Order</li> <li>• Lagrange's Form, Standard Forms</li> <li>• Charpit's Method</li> </ul>	<b>8</b>

**Text/ Reference Books:**

- Advanced Engineering Mathematics; Erwin Kreyszig; Wiley 9th Edition.
- Calculus and Analytical Geometry; Thomas and Finney; Narosa Publishing House N. Delhi.
- A Text Book of Differential Equations; M.Ray and Chaturvedi; Students Friends & Co. Publisher; Agra.
- Higher Engineering Mathematics; B.V.Ramana; Tata Mcgra Hill.
- Mathematics for Engineers; Chandrika Prasad; Prasad Mudranalaya Allahabad.
- Advanced Mathematics for Engineers; Chandrika Prasad; Prasad Mudranalaya Allahabad.



## BT 203 ENGINEERING PHYSICS-II

UNIT	CONTENTS	CONTACT HOURS
I	<b>Quantum Mechanics</b> <ul style="list-style-type: none"> <li>• Compton effect &amp; quantum nature of light</li> <li>• Derivation of time dependent and time independent Schrödinger's Wave Equation</li> <li>• Physical interpretation of wave function and its properties</li> <li>• Boundary conditions</li> <li>• Particle in one-dimensional box.</li> </ul>	8
II	<b>Applications of Schrödinger's Equation</b> <ul style="list-style-type: none"> <li>• Particle in three-dimensional boxes. Degeneracy</li> <li>• Barrier penetration and tunnel effect.                      • Tunneling probability, Alpha Decay.</li> </ul> <b>Summerfield's Free electron gas model</b> <ul style="list-style-type: none"> <li>• Postulates, Density of energy states, Fermi energy level.</li> <li>• Band Theory of solids</li> </ul>	8
III	<b>Lasers</b> <ul style="list-style-type: none"> <li>• Theory of laser action: Einstein's coefficients, Components of a laser, Threshold conditions for laser action.</li> <li>• Theory, Design and applications of He-Ne and semiconductor lasers.</li> <li>• Elementary ideas of Q-switching and mode locking.</li> </ul> <b>Holography</b> <ul style="list-style-type: none"> <li>• Holography versus photography, Basic theory of holography, Basic requirement of a holographic laboratory.</li> <li>• Applications of holography in microscopy and interferometry.</li> </ul>	8
IV	<b>Coherence</b> <ul style="list-style-type: none"> <li>• Spatial and temporal coherence, Coherence length, Coherence time and 'Q' factor for light.</li> <li>• Visibility as a measure of coherence.</li> <li>• Spatial Coherence and size of the source.</li> <li>• Temporal coherence and spectral purity.</li> </ul> <b>Optical Fibers</b> <ul style="list-style-type: none"> <li>• Optical fiber as optical wave-guide.</li> <li>• Numerical aperture and maximum angle of acceptance.</li> </ul>	8
V	<b>Nuclear Radiation Detectors and Dielectrics</b> <ul style="list-style-type: none"> <li>• Characteristics of gas filled detectors: general considerations.</li> <li>• Constructions, Working and properties of: Ionization chamber, proportional Counter, G.M.Counter and Scintillation Counter.</li> <li>• Dielectrics: Electric break down and measurement of dielectric constant</li> </ul>	8

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Fundamental of Optics; Jenkins and White; Fourth Edition, McGraw Hill.</li> <li>• Optics; Ajoy Ghatak; Third Edition, Tata McGraw Hill.</li> <li>• Quantum Mechanics; Schiff; Third Edition, McGraw Hill.</li> <li>• Quantum Mechanics; Merzbacher; Third Edition, Wiley India.</li> <li>• Nuclear Physics: Principles and Applications; John Lilley, Wiley India.</li> </ul>

## BT 203-P ENGINEERING PHYSICS LAB-II

1	To determine the height of water tank with the help of a Sextant.
2	To determine the dispersive power of material of a Prism for Violet Red and yellow colours of Mercury light with the help of a spectrometer.
3	To measure the Numerical Aperture of an Optical Fibre.
4	To determine the ferromagnetic constants retentivity, permeability and susceptibility by tracing B-H curve using C.R.O.
5	To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted).
6	To determine the high resistance by method of leakage, using a Ballistic galvanometer.
7	To verify the expression for the resolving power of a Telescope.
8	To determine the specific resistance of the material of a wire by Carey Fosters bridge.
9	To determine the specific resistance of the material of a wire by Carey Fosters bridge.

## BT 204 ENGINEERING MECHANICS

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<p><b>Statics Of Particles and Rigid Bodies:</b> Fundamental laws of mechanics, Principle of transmissibility, System of forces, Resultant force, Resolution of force, Moment and Couples, Varignon's Theorem, Resolution of a force into a force and a couple, Free body diagram, Equilibrium, Conditions for equilibrium, Lami's theorem.</p> <p><b>Virtual work:</b> Principle of Virtual Work, Active forces and active force diagram.</p>	<b>8</b>
<b>II</b>	<p><b>Centroid &amp; Moment of Inertia:</b> Location of centroid and center of gravity, Moment of inertia, Parallel axis and perpendicular axis theorem, Radius of gyration, M.I of composite section, Polar moment of inertia, M.I of solid bodies.</p> <p><b>Lifting Machines:</b> Mechanical advantage, Velocity Ratio, Efficiency of machine, Ideal machine, Ideal effort and ideal load, Reversibility of machine, Law of machine, Lifting machines; System of Pulleys, Simple wheel and axle, Wheel and differential axle, Weston's differential pulley block, Worm and worm wheel, Single purchase winch crab.</p>	<b>8</b>
<b>III</b>	<p><b>Friction:</b> Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction.</p> <p><b>Belt Drive:</b> Types of belts, Types of belt drives, Velocity ratio, Effect of slip on Velocity ratio, Length of belt, Ratio of tensions and power transmission by flat belt drives.</p>	<b>8</b>
<b>IV</b>	<p><b>Kinematics of Particles and Rigid Bodies:</b> 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.</p> <p><b>Kinetics of Particles and Rigid Bodies:</b> Newton's laws, Equation of motion in rectangular coordinate, radial and transverse components, Equation of motion in plane for a rigid body, D'Alembert principle.</p>	<b>8</b>
<b>V</b>	<p><b>Work, Energy and Power:</b> Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Nonconservative Force, Conservation of energy.</p> <p><b>Impulse and Momentum:</b> 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</p>	<b>8</b>

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Vector Mechanics for Engineers; Beer and Johnston; Tata McGraw-Hill.</li> <li>• Engineering Mechanics; Hibbeler; Pearson Education.</li> <li>• Engineering Mechanics; Meriam and Kraige; John Wiley &amp; Sons.</li> <li>• Engineering Mechanics; Timoshenko and Young; Tata McGraw-Hill.</li> <li>• Engineering Mechanics; Shames; Pearson Education.</li> <li>• Engineering Mechanics; Boresi and Schmidt; CL-Engineering.</li> <li>• Engineering Mechanics; Andrew Pytel &amp; Kiusalas; Cengage Learning.</li> </ul>

## BT 205 FUNDAMENTAL OF COMPUTER PROGRAMMING

UNIT	CONTENTS	CONTACT HOURS
<b>I</b>	<b>Programming in C:</b> Structure of C Program, Concept of Preprocessor, Macro Substitution, Intermediate code, Object Code, Executable Code. Compilation Process, Basic Data types, Importance of braces ( { } ) in C Program, enumerated data type, Identifiers, Scope of Variable, Storage Class, Constants, Operators & Expressions in C, Type Casting, printf( ) and scanf ( ) with format specifiers, reading single character.	<b>8</b>
<b>II</b>	Control Statements, Command Line Arguments, Arrays in C, Pointers, Using pointers to represent arrays, Pointer & address arithmetic. Structures, using typedef.	<b>8</b>
<b>III</b>	Arrays of Structures & pointers, File Handling (fscanf, fprintf, feof, fopen, fclose, fread, fwrite only). Dynamic memory Allocation.	<b>8</b>
<b>IV</b>	Functions in C, Passing Parameters (By value & Reference), using returned data, Passing arrays, structures, array of structures, pointer to structures etc., passing characters and strings, The void pointer.	<b>8</b>
<b>V</b>	Stored Program Architecture of Computers, Storage Device- Primary Memory and Secondary Storage, Random, Direct, Sequential access methods. Concept of High-Level, Assembly and Low Level programming languages. Representing Algorithms through flow chart, pseudo code, step by step. <b>Number System:</b> Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. r's and (r-1)'s complement, Representation of alphabets.	<b>8</b>

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Ritchie &amp; Kernighan; The C Programming language; 2nd Ed., PHI.</li> <li>• Dey &amp; Ghosh; Computer Fundamentals and programming in C; Oxford.</li> <li>• Kamthane; Programming in C; 2nd Ed., Pearson.</li> <li>• Schildt; The Complete Reference; 4th Ed., TMH.</li> <li>• Balaguruswamy; Programming in ANSI C; 5th Ed., TMH.</li> <li>• V. Rajaraman; Fundamentals of Computers; 5th Ed. PHI, 2011.</li> <li>• Forouzan et.al; Computer Science; 3rd Ed. Cenage Learning.</li> </ul>

## BT 205-P COMPUTER PROGRAMMING LAB

1	Simple OS Commands, vi editor, compiling program, compiler options, linking libraries.
2	Simple input output program, integer, real, character and string. (Formatted & Unformatted), Using Command Line Arguments.
3	Conditional statement (if, if-else-if, switch-case)
4	Looping & iterations (for, while, do-while, continue, break) 5. Using Arrays (one, two and three dimensional) Using Structures and Union.
5	Program using Function (with and without recursion), passing parameters by value & reference.
6	Using pointers.
7	File handling.
8	Simple OS Commands, vi editor, compiling program, compiler options, linking libraries.
9	Simple input output program, integer, real, character and string. (Formatted & Unformatted), Using Command Line Arguments.

## BT 206 ENVIRONMENTAL STUDIES & DISASTER MANAGEMENT

UNIT	CONTENTS	CONTACT HOURS
I	Do's and Don'ts for prevention of life and property due to earthquake, tsunami, cyclone fire, flood and landslides, Legislative responsibility and community base disaster management	8
II	Introduction, General introduction to environment, biotic and abiotic environment Environmental pollution, Adverse effect of pollution n environment, control strategies various acts and regulations for environmental protection	8
III	<p><b>Water Pollution</b> Surface and underground sources of water, Water quality standards, impurities in water and their removal, River water pollution, eutrophication of lakes Domestic waste water management,</p> <p><b>Air Pollution</b> Sources of air pollution, adverse effects on human health, Greenhouse effect, global warming, acid rain, ozone depletion</p> <p><b>Ecology</b> Basics of species, biodiversity, population dynamics, Energy flow, ecosystems, environmental impact assessment, Renewable sources of energy, Sustainable development</p>	8
IV	<p><b>Introduction &amp; Basic Concept of Disasters</b> Types of disasters and their brief introduction: Natural &amp; Man-made disasters, Earthquakes, tsunami, cyclone, flood, drought, landslide, Nuclear, Chemical, Fire and environmental hazards</p>	8
V	<p><b>Disaster Management Cycle &amp; its Components</b> Mitigation and prevention, preparedness, Response (rescue &amp; relief), rehabilitation and recovery Disaster vulnerability &amp; risk and its reduction, Maps showing earthquake, cyclone, flood and landslide hazards in India</p>	8

### Text/ Reference Books:

- Chemistry of water treatment; Samuel Faust & Osman M Aly; CRC Press
- Boilers water treatment. Principles and Practice; Colin Frayne; CRC Press
- Corrosion Understanding the Basic; by Joseph R Davis; ASM International
- Atmospheric pollution; by W Buch ; Tata McGraw Hill(TMh)
- Introduction to Environmental Science; by G Tyler Miller and Scott Spoolman; Cengage Learning
- Introduction to Environmental Engineering; by Mackenzie L Davis and David A Cornwell; Tata McGraw Hill(TMh)

## BT 207 BASIC MECHANICAL ENGINEERING

UNIT	CONTENTS	CONTACT HOURS
I	<p><b>Basic Concepts;</b> Thermodynamic systems; Properties; Work and heat; Zeroth Law of Thermodynamics. Working Fluids; Ideal Gas Laws; Calculation of properties of ideal gases for various thermodynamic cyclic and non-cyclic processes.</p> <p><b>First Law of Thermodynamics;</b> First Law of thermodynamics; Non-flow and flow energy equations.</p> <p><b>Second Law of Thermodynamics;</b> Statements of Second Law of Thermodynamics; Reversible process; Entropy; Carnot cycle</p>	9
II	<p><b>Internal Combustion Engines;</b> Otto and Diesel cycle; Air standard efficiency Classification; Two and four stroke engines; Construction and working of petrol and diesel engines; Comparison of petrol and diesel engines; Comparison of 4 - stroke and 2 - stroke engines; Principle and working of simple carburetor.</p>	7
III	<p><b>Properties of Steam:</b> Generation of steam; Quality and properties of steam; Use of steam table; Mollier chart and T-s diagram for steam properties and various Processes.</p> <p><b>Steam Generators:</b> Classification of steam generators; brief study of Construction and working of Babcock and Wilcox boiler and Cochran boiler.</p>	7
IV	<p><b>Gas Compressors:</b> Classification; Working principle of reciprocating compressor, rotary compressor, centrifugal compressor and axial flow compressor; Comparison; Applications.</p> <p><b>Refrigeration and Air-conditioning;</b> Elementary concepts of refrigeration and air-conditioning; Vapour compression refrigeration Cycle; Working, principle and schematic diagrams of refrigerators, window air conditioners and ice plants.</p>	8
V	<p><b>METAL CASTING PROCESSES ;</b>Patterns - Types of patterns - Pattern materials - pattern allowances - Moulding sand - Properties of moulding sand - types of moulding - preparation of Green sand mould for casting – construction and operation of cupola - casting defects (brief description).</p> <p><b>METAL FORMING PROCESSES-</b> Principles of forging, Rolling, drawing, extrusion and brief description of hot and cold working process.</p> <p><b>METAL JOINING PROCESSES;</b> Principles of welding - fundamental of arc welding, Gas welding , gas cutting , Brazing and soldering.</p> <p><b>METAL MACHINING PROCESS;</b> Types of lathes - Main components and the functions of a centre lathe - operations - cutting tools - drilling machines, horizontal and vertical milling machine, up cut and down cut milling machine.</p>	9

Text/ Reference Books:
<ul style="list-style-type: none"> <li>• Mathur, M.L., Mehta, F.S., and Tiwari, R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2011.</li> <li>• Rudramoorthy, R., Thermal Engineering, Tata McGraw Hill Book Company, New Delhi.</li> <li>• Hazra Chowdary, S.K. and Bose, Workshop Technology, Vol. I and II, Media Promoters and Publishers Pvt. Ltd.</li> <li>• Nag P.K., Engineering Thermodynamics, Tata Mc-Graw Hill</li> <li>• Van G.J. Wylen and Sonntag R.E., Fundamental of Thermodynamics</li> </ul>

## BT 207-P BASIC MECHANICAL ENGINEERING LAB

1	Comparative model study and demonstration of four stroke diesel and petrol engines.
2	Comparative model study and demonstration of two stroke petrol and diesel engines.
3	Model Study of fuel supply systems of diesel and petrol engines.
4	Model Study of cooling, lubrication and ignition system in diesel and petrol engines.
5	Model study of Babcock and Wilcox, Cochran boiler and locomotive boiler.
6	Model study of Boiler mounting and accessories.
7	Study and demonstration of double stage air compressor test rig.
8	Study and demonstration of vapour compression refrigeration system.
9	Study and demonstration of window air conditioner.
10	Study and demonstration of ice plant.

## BT 208-P MACHINE DRAWING

<b>I</b>	Introduction to machine drawing Dimensioning		
<b>II</b>	Locations and placing		
<b>III</b>	Orthographic projections: First & third angle methods Sheet 1: Orthographic Projections (3 Problems) Sheet 2: Sectional Views (3 Problems) Sheet 3: Riveted joints, lap joints, butt joints, chain riveting, zig-zag riveting Sheet 4: Screw fasteners, different threads, Nuts & bolts locking devices, set screws, foundation Sheet 5: Bearing, Plummer block		
<b>IV</b>	Instructions on free hand sketching		
<b>V</b>	List of free hand sketches <table style="width: 100%; border: none;"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> <li>• Different type of lines</li> <li>• Conventional representation of materials</li> <li>• Screw fasteners</li> <li>• Bearing: Ball, roller, needle, foot step bearing</li> <li>• Coupling: Protected type, flange, and pin type flexible coupling</li> </ul> </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> <li>• Welded joints</li> <li>• Belts and pulleys</li> <li>• Pipes and pipe joints</li> <li>• Valves</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>• Different type of lines</li> <li>• Conventional representation of materials</li> <li>• Screw fasteners</li> <li>• Bearing: Ball, roller, needle, foot step bearing</li> <li>• Coupling: Protected type, flange, and pin type flexible coupling</li> </ul>	<ul style="list-style-type: none"> <li>• Welded joints</li> <li>• Belts and pulleys</li> <li>• Pipes and pipe joints</li> <li>• Valves</li> </ul>
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### Text/ Reference Books:

- Machine Drawing; Lakshminarayan & M.L Mathur; Jain Brothers.
- Machine Drawing; N.D.Bhatt; Charotar Publishing House Pvt. Ltd.