### Scheme of Studies

**B. Tech. Degree Programme (Regular)**

(Common to all Disciplines)

#### 1\textsuperscript{st} Year THEORY (TERM – I)

<table>
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<th>Sr. No</th>
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**PRACTICAL/DRAWING/DESIGN**

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# Scheme of Studies

## B. Tech. Degree Programme (Regular)
(Common to all Disciplines)

### 1st Year THEORY (TERM II)

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</table>
IMPORTANT NOTES

1. Laboratory Courses are being offered as distinct courses (0-0-2) without being mixed with lecture components.

2. Conduct of Lab Courses:
   a. At least ten experiments/programs are to be performed in a semester.
   b. It is expected that more experiments/programs are designed and set as per the scope of the syllabus, which may be added to the above list.
   c. One or more than one experiments/programs may be performed in one lab period in order to utilize the time properly.
   d. The scheme of operation is to be approved by HOD.

3. Students admitted through Lateral Entry Scheme will be required to take a Bridge Course on Mathematics (3-0-0) as an Audit Course.

4. Assessment of Industrial/Field Training and Internship-I will be based upon certificate of Industry/Field training obtained by the student, report, seminar and viva-voce examination. A student who is awarded 'FF' Grade is required to repeat Industrial/Field Training.

5. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.

6. For open elective, all students will be permitted to opt for any one elective run by another department. However, the departments will offer only those elective courses for which they have expertise. Further, the students will not be allowed to opt for any course under this category, which has already been done.

7. Students are allowed in the examination the use of single memory, non-programmable calculator. However, sharing of calculator is not permitted.
B.Tech. Degree Programme

DETAILED SYLLABUS

<table>
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<tr>
<th>MA - 101</th>
<th>APPLIED MATHEMATICS - I</th>
<th>L-T-P</th>
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OBJECTIVE:

To acquaint the students with the various concepts and tools of applied mathematics which will be very basic and the very soul and guide of various engineering subject.

1. **MATRICES & ITS APPLICATIONS: Elementary transformations:** Inverse of the matrix using elementary transformation; Normal form of a matrix; Rank of a matrix; Solution of simultaneous linear equations; Linear dependence and independence of vectors; Linear and Orthogonal transformations; Eigen values and Eigen vectors & Properties; Cayley-Hamilton theorem and its applications; Diagonalization of Matrices; Similar matrices; Quadratic forms.

2. **INFINITE SERIES: Convergence & Divergence; Comparison Test:** D’Alemberts Ratio Test; Cauchy’s Root Test; Rabee’s Test; Logarithmic Test; Gauss Test; De Morgan’s & Bertrand’s Test; Cauchy’s Integral Test; Libnitz’s Alternating Test; Absolutely Convergent; Conditionally Convergent.

3. **APPLICATION OF DIFFERENTIATIONS:** Taylor’s Series & Maclurin’s Series; Asymptotes; Curvature.

4. **PARTIAL DIFFERENTIATION:** Functions of two or more variables; Partial Derivatives; Total Differential & Differentiability; Derivative of Composite & Implicit Functions; Jacobians; Higher Order Partial Derivatives.

5. **APPLICATION OF PARTIAL DIFFERENTIATION:** Homogeneous Functions & Euler’s Theorem; Taylor’s series for functions of two variables; Maxima-Minima of function of two and three variables, Lagrange’s method of undetermined multipliers; Differentiation under integral sign.

6. **FOURIER SERIES:** Euler’s formula; Conditions for a Fourier expansion; Change of interval; Fourier expansion of odd and even function; Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave functions; Half range sine and cosine series.

7. **ORDINARY DIFFERENTIAL EQUATIONS & ITS APPLICATIONS:** Exact differential equations; Equations reducible to exact differential equations; Application of Differential Equations of first order and first degree to Simple electrical circuits; Newton’s law of cooling, Heat flow and Orthogonal trajectories.

TEXT BOOK


REFERENCE BOOKS


<table>
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<th>PHB-101</th>
<th>APPLIED PHYSICS</th>
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1. **ROTATIONAL DYNAMICS**: Rotational Motion: description of rotation (angular displacement, angular velocity and angular acceleration); rotational motion with constant angular acceleration; moment of inertia: parallel and perpendicular axes theorems; rotational kinetic energy; torque and angular momentum; rolling motion.

2. **WAVES AND OSCILLATIONS**: Kinematics of simple harmonic motion; differential equation of a simple harmonic oscillator and its solution; graphical representation of simple harmonic motion; potential and kinetic energies of simple harmonic motions; spring mass system; simple and compound pendulum; forced & damped oscillations, resonance.

3. **Laser**: Principle of laser, Spontaneous and Stimulated emission, Laser action, characteristics of laser beam, He-Ne, Ruby and semiconductor lasers, applications **Fiber Optics**: Propagation of light in optical fibers, numerical aperture, acceptance angle, concept of modes, Types of optical fiber, applications, advantages and disadvantages.


5. **INTERFERENCE**: Interference by division of wave front; Fresnel's biprism and its application to find wavelength; interference by division of amplitude; Newton's rings and its applications; determination of wavelength and refractive index of liquids; Michelson interferometer and its applications; determination of wavelength; resolution of spectral lines (difference in wavelength); determination of refractive index of thin sheet.

6. **DIFFRACTION**: Difference between interference and diffraction; difference between Fraunhofer and Fresnel diffraction; Fraunhofer diffraction through single slit; variation of intensity (analytical); plane transmission diffraction grating; variation of intensity
B.Tech. Degree Programme

(analytical), absent spectra; maximum order spectra; Dispersive and Resolving power of grating.

7. **POLARIZATION**: Polarised and unpolarized light; double refraction; Nicol prism; quarter and half wave plates; optical activity; Dextro and Leavo rotatory; specific rotation; biquartz and Laurent's half-shade polarimeters

**TEXT BOOK**
1. Modern Physics for Engineers – S.P.Taneja (R. Chand)
2. Engineering Physics – SatyaPrakash (Pragati Prakashan)

**REFERENCE BOOKS**
1. Sears, F.W., “Electricity and Magnetism”, Narosa

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**Introduction:**
Impact of Infrastructural Development on the Economy of a Country, Role of Civil Engineers in improving living conditions of society.

**Surveying**
Introduction: Surveying and leveling, Classification of surveying, Plans and maps, Scales, Units of measure, Bearings, Whole Circle Bearings, and Reduced Bearings, Elevation measurements, contours, Introduction to Theodolite

**Construction Materials**
Requirement, types, uses, properties and importance of Civil Engineering materials like Stone, Bricks, Lime, Cement, Ferrous and Non Ferrous Metals, Timber, Sand, Aggregate, Mortar and Concrete, Paints and Varnishes, Glass, Plastic.

**Elements of Building Construction**
Planning: Elementary principles and basic requirements of a building planning,
Construction: Classification of buildings based upon occupancy and structure, Common building components, their functions, Introduction to building bye-laws.

**Water Resources Engineering**

**Transportation Engineering**
Role of Transportation in National development, Transportation Ways, Surface Transportation Aviation and Waterways, Classification of Highways, Highway materials properties and highway construction, BOT Projects for Highways, Elements of Traffic Engineering and Traffic Control.

**Public Health Engineering**
Water supply systems, Treatments and standards  Plumbing Sanitary Engineering, Sewage and Sewerage Systems, Sewage Disposal, Types of Pollutions and Pollutants,

**REFERENCE BOOK**-
Basic Civil Engineering-S.S. Bhavikatti (New Age).
Basic Civil and Environmental Engineering-C.P. Kaushik, S.S. Bhavikatti (New Age).

<table>
<thead>
<tr>
<th>CSB-101</th>
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**OBJECTIVE**
To introduce the students the basic of C and Logic behind the implementation of different features of C like different data types , function, array, control statements, pointers, structures, file processing and recursion

1. **BASIC OF PROGRAMMING AND OVERVIEW OF C PROGRAMMING**: Programming fundamental, Problem definition, Algorithm, Flowchart and their symbol. Types of programming languages Translators, Introduction to C, Structure of C program, C character Set, Identifiers and keywords, data types, constants, variables and arrays, Declarations, expressions, statements, Symbolic constants, type conversion, Types of operators, Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators and their hierarchy & associativity, Input and output functions in C, some simple C programs, header files, common programming errors.

2. **CONTROL STATEMENTS**: Sequencing, Selection: conditions; the if statement; if statements with compound statements; nested if statements and multiple-alternative decisions; the switch statement. Loop Control Statements – For loop, while loop, Do-while loop and nested loops, break statement, The continue statement, The goto statement, The comma operator

3. **TOP-DOWN DESIGN WITH FUNCTION**: Building programs from existing information; library functions; top-down design and structure charts; Defining a function, accessing a function, function prototypes, passing arguments to a function, Call by value and reference, Types of Storage Classes: Scope of variables – Global ,auto and Static Variables , Recursion,
4. **ARRAYS & STRING HANDLING:** declaring, referencing and initializing arrays; array subscripts; using for loops for sequential access; using array elements as function arguments; array arguments; searching and sorting an array; multidimensional arrays; string basics; string library functions; assignment and substrings; longer strings; concatenation and whole line input; string comparison;; character operations; string to number and number to string conversions.

5. **POINTERS BASICS:** Fundamentals, Pointer declarations, Passing pointers to the functions, pointers and one dimensional array, dynamic memory allocation, Operations on pointers, arrays of pointers. Function returning a Pointer, A pointer to a Function, , pointers to pointers, pointers and strings, Void pointers. arguments to function main

6. **STRUCTURE ,UNION AND PREPROCESSING:** Declaration and Initialization of structure, structure within structure, Array of structure, Passing to a function, Pointer to structure, Union ,Union of structure, Enumerated Data Type , typedef, Bitwise operators, Bit- fields in Structures , Pre-processor directives, conditional compilation;; defining macros with parameters

7. **FILE PROCESSING:** Introduction, Streams and File types, Opening and closing a data file, Input / Output operation on files, Text mode Versus Binary Mode, Formatted Input and output operation with files, Structures read and write in files, Random access to Files, Error detection during File operations, other useful file handling operations.

**TEXT BOOK**


**REFERENCE BOOKS**

Unit-1: Phase Rule:
Terminology, Definition of phase rule, Derivation of phase rule equation, One component system (H₂O system and CO₂ system), two components system, Simple eutectic system (Pb – Ag), Pattinson’s Process, congruent system (Zn – Mg), incongruent system, Merits and demerits of phase rule.

Unit-2: Corrosion and its prevention:
Definition, Types of corrosion: Dry, wet corrosion (rusting of iron), galvanic corrosion, differential aeration corrosion, stress corrosion. Factors affecting corrosion, preventive measures (proper design, Cathodic and Anodic protection, sacrificial protection and barrier protection), Soil Corrosion, Microbiological Corrosion.

Unit-3: Lubrication and Lubricants:
Introduction, mechanism of lubrication, Classification of lubricants, (Solid, semi-solid, liquid and emulsion), Properties of lubricants (Flash & Fire point, Saponification number, Iodine value, Acid value, Viscosity and Viscosity index, Aniline point, Cloud point and pour point) Numerical problems based of viscosity Index. Biodegradable lubricants.

Unit-4: Qualitative aspects of water: Part-A
Sources of water, impurities in water, hardness of water and its determination, (EDTA method). alkalinity of water and its determination, Related numerical problems, scale and sludge formation, Boiler corrosion & caustic embrittlement.

Part-B:
Treatment of water: Zeolite, Ion – exchange process, mixed bed demineralization, Desalination (Reverse Osmosis, electro dialysis)

Unit-5 Polymers and polymerization:
Introduction & Classification of polymers mechanism of polymerization (Addition, condensation and co-ordination) effect of structure on properties of polymers, Bio polymerization, Bio degradable polymerization, preparation, properties and application of thermo – plastics (PVC, PVA, Teflon) & thermosetting polymers (PF, UF), Natural elastomers and synthetic rubber (SBR, GR –N), Silicones, Introduction of polymeric composites.

Unit-6 Instrumental Methods of Analysis:
Principle and application of Thermal methods of Analysis. (TGA, DTA, DSC), Basic concepts of spectroscopy, Lambert and Beers law, Absorption and Emission spectroscopy Different spectroscopic Techniques (UV- Visible and IR spectroscopy) elementary discussion on Flame photometry.
Unit-7
Part-B: Catalyst: introduction, function, energy barrier diagram, homogenous, heterogeneous, negative catalyst, induced catalyst, autocatalyst, enzyme as catalyst, lock and key mechanism.

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Objective: To enhance the student’s word power, listening & reading comprehension and the conversational skill; to introduce phonetics, its importance and to enable the students for phonetic transcription; to make them capable of drafting leave applications and expansion of ideas; to make them aware of the basics of campus etiquettes so that they would behave with a sense of responsibility.

UNIT 1:
Word Power: A set of selected 50 synonyms, antonyms, homonyms&homophones; word formation; suffixes & prefixes

UNIT 2:
Comprehension: Listening comprehension & reading comprehension; Listening to recorded speeches, TV News and other audio materials to test listening comprehension; comprehension of unseen passages through reading

UNIT 3:
Oral Communication: Introduction to phonetics; Importance of phonetics; introduction to speech organs, articulation and phonetic symbols; Phonetic transcription of words; Principles of oral communication

UNIT 4:
Written communication: General writing & Technical writing; Picture composition; Expanding hints, proverbs etc.; Slogan making; Movie review

UNIT 5:
Letter writing: Types of letter writing; Structure & Lay out; Leave application; Letter of enquiry & response with respect to educational & official matters; Informal letter writing expressing or discussing social or educational issues

UNIT 6:
Conversational ability: Strategies for effective conversation; Developing conversation on topics of current importance; Telephonic conversation & telephone etiquettes

UNIT 7:
Campus Etiquettes: Inter and intra personal behavior; Etiquettes in the class room & examination; Importance of civic sense; Sense of belongingness; Role of self esteem & self confidence in personality development
Prescribed Text book

1. Technical Communication Principles & Practice (2\textsuperscript{nd} Ed.) by Meenakshi Raman & Sangeeta Sharma, Oxford University
2. The Functional Aspects of Communication Skills, Dr.Prajapati Prasad, S.K.Kataria & Sons, New Delhi

SUGGESTED READING:

1. Language in Use (Upper intermediate Level, Adrian Doff Christopher Jones, Cambridge University Press
5. The sounds of English, Veena Kumar, Makaav Educational Software, New Delhi.

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<th>MA - 102</th>
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OBJECTIVE:
To acquaint the students with the various concepts and tools of applied mathematics which will be very basic and the very soul and guide of various engineering subject.

1. **DIFFERENTIAL EQUATIONS OF HIGHER ORDER & ITS APPLICATIONS:** Linear differential equations of second and higher order; Complete solution; Method to find C.F.; Method to find P.I.; Method of variation of parameters to find P.I.; Cauchy’s linear equations & its solutions; Legendre’s linear equations & its solution; Simultaneous linear equations with constant coefficients & its solutions; Application of linear differential equations to: Simple pendulum; Oscillatory electric circuits.

2. **LAPLACE TRANSFORMS & ITS APPLICATIONS:** Laplace Transform (LT) of elementary functions; Properties of LT; Existence conditions of LT; LT of derivatives; LT of integrals; LT of the function multiplication by \( t \); LT of the function division by \( t \); Inverse LT’s; LT of convolution of two functions; Application of linear differential equations & Simultaneous linear differential
equations with constant coefficients; Periodic function & its LT; Laplace transform of Haviside unit step function; Unit impulse (Dirac-delta) function.

3. **CURVE TRACING:** Procedure for tracing of Cartesian Curves & Its Examples; Procedure for tracing of Polar Curves & Its Examples; Procedure for tracing of Parametric Curves & Its Examples.

4. **FOURIER TRANSFORM & ITS APPLICATIONS:** Fourier Integral Theorem; Fourier Sine Integral; Fourier Cosine Integral; Complex Fourier Integral; Fourier Sine Transform & Its Inverse; Fourier Cosine Transform & Its Inverse; Finite Fourier Sine Transform & Its Inverse; Finite Fourier Cosine Transform & Its Inverse. Properties of Fourier Transforms (Linear, Change of Scale, Shifting Modulation theorem); Fourier transforms of derivatives; Convolution Theorem for Fourier Transform; Relation between Fourier and Laplace Transforms; Application of Fourier Transforms to Boundary Value Problems.

5. **APPLICATIONS OF SINGLE INTEGRATIONS & DOUBLE INTEGRATIONS:** Application of Single Integration to find Volume of solids and Surface area of solids of revolution. Double Integral; Change of Order of Integration; Double Integral in Polar Co-ordinates.

6. **APPLICATIONS OF MULTIPLE INTEGRATIONS:** Application of Double Integral to find Area enclosed by plane curves and Volume of solids of revolution. Triple Integral; Volume of Solid; Change of Variables; Beta & Gamma functions & relationship between them.

7. **VECTOR CALCULAS:** Differentiation of vectors; Scalar & vector point functions; Gradient of a scalar field & its physical interpretations; Directional derivative; Divergence of vector field & its physical interpretations; Curl of a vector field and their physical interpretations; Integration of vectors; Line integral; Surface integral; Volume integral; Green’s theorem and its applications; Stokes’ theorem and its applications; Gauss’s theorems and its simple applications.

**TEXT BOOK**


**REFERENCE BOOKS**

UNIT-1
Introduction to basic machines tools
Introduction to Commonly used Machine Tools in a Workshop:- Lathe, Shaper, Planer, Milling, Drilling, Slotter..

UNIT-II
Basic concept of thermodynamics;
Introduction, States, Work, Heat, Temperature, Zeroth, 1st, 2nd and 3rd law of thermodynamics, Concept of internal energy, enthalpy and entropy. Problems
Thermodynamic properties of Steam, Use of steam tables,

UNIT-III
Refrigeration & Airconditioning: 
Introduction to refrigeration and air-conditioning, Rating of refrigeration machines, Coefficient of performance, Simple refrigeration vapour compression cycle, Psychrometric charts and its use, Human comforts.

UNIT-IV
Power Transmission Methods and Devices: 
Introduction to Power transmission, Belt, Rope, Chain and Gear drive. Types and functioning of clutches.

UNIT-VI
Stresses and Strains:
Introduction, Concept & types of Stresses and strains, Poison's ratio, stresses and strains in simple and compound bars under axial, flexure & torsional loading, Stress- strain diagrams, Hooks law, Elastic constants & their relationships.

UNIT-VII
Basics of mechanics
Equilibrium of rigid body . Equilibrium of particles .Structural analysis

Text Books:
Elements of Mechanical Engineering – R.K.Rajput Lakmi Pub., Delhi
Elements of Mechanical Engineering – D.S.Kumar, S.K. Kataria and Sons
Engineering Thermodynamics- P.K.Nag TMH, New Delhi
Refrigeration & Airconditioning – Arora & Domkundwar, Dhanpat rai & co.pvt ltd
B.Tech. Degree Programme


Principles of Manufacturing Materials and Processes - Campbell, J.S. - McGraw- Hill

Reference Books:
Strength of Materials - G.H. Ryder, Pub.- ELBS.
Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi
Refrigeration & Airconditioning- C.P. Arora. Pub. - TMH, New Delhi
Manufacturing Process and Systems - Ostwald, Munoz, John Wiley.
Workshop Technology, Vol. 1, 2 & 3 – Chapman, WAJ, Edward Arnold.

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<th>ELEMENT OF ENGINEERING - III</th>
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OBJECTIVE
To provide basic knowledge and understanding of fundamental concepts of Electrical and electronics technology, explaining various basic laws governing the circuit configurations and evaluation, and its applications to electrical circuits.

1. CIRCUIT ANALYSIS: Basic passive circuit elements, KCL, KVL; independent and dependent sources; network theorems – nodal analysis, mesh analysis, Thevenin’s theorem, Norton’s theorem, linearity and superposition theorems.

2. SINGLE PHASE AC CIRCUIT: Generation of AC voltages, frequency, cycle, period, instantaneous, peak, rms and average value, peak factor, form factor, phase and phase difference, polar, rectangular, exponential and trigonometric representation of phasors; r, l and c components, behavior of these components in a.c. circuits; series and parallel a.c. circuits and their phasor diagrams; concept of impedance and admittance; power and power factor, complex power; resonance-series and parallel resonance; Q factor; bandwidth.

3. INTRODUCTION TO 3-Ø CIRCUITS: Phase and line voltages and currents; balanced star and delta circuits; phasor diagram, power equation; measurement of three phase power by two wattmeter method; comparison of single phase, three phase and DC system and their relative advantages.

4. MAGNETIC CIRCUITS: Magnetic field, magnetic flux, flux density, mmf, field strength, permeability, reluctance; B–H curve of hysteresis loop; comparison of electrical and
magnetic circuits. B.Tech. Degree Programme 28

Transformer: Principle of transformer and its emf equation; ideal transformer, non ideal transformer, autotransformer; construction of a transformer; transformer losses; open circuit of short circuit test; efficiency; voltage regulation.

5. BASICS OF ROTATING MACHINES: DC Machines: Construction and operation of dc machines (both dc generator and motor); emf equation; types of dc generator and their characteristics; starting and speed control of dc motor. AC Machines: Construction and working of induction motor; its torque-speed characteristics; importance of slip.

6. SEMICONDUCTOR DEVICES: p – n junction diode, zener diode operation & its characteristics, BJT: types, characteristics, biasing techniques & applications; FET: types & characteristics; introduction to op-amps & their applications.

7. INTRODUCTION TO DIGITAL ELECTRONICS: Binary numbers; digital logic gates; Boolean algebra combinational and sequential logic circuits— flip flops, introduction to counters, registers

TEXT BOOK

REFERENCE BOOKS

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<th>EC - 201</th>
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OBJECTIVE
The purpose of this course is to give basic electronics concept; their operational significance and its basic application.

PRE-REQUISITES
Knowledge of electricity, solid state physics

1. HISTORICAL BACKGROUND:
   Vacuum tubes; working of vacuum tube and their characteristics; vacuum diode; triode; tetrode and pentode

2. PN JUNCTION:
B.Tech. Degree Programme

Depletion layer; Barrier potential; Forward and reverse bias; Breakdown voltage; PIV; switching characteristics of p-n junction diode; knee voltage; load line; and operating Point Ideal p-n junction diode; junction capacitance; zener diode.

3. RECTIFIERS AND FILTERS:
Half wave; centre tap full wave and bridge rectifier; percentage of regulation; PIV; ripple factor; C; RC; LC and PI filter; voltage doubler; clipping and clamping circuit; voltage regulation.

4. BIPOLAR JUNCTION TRANSISTOR:
Introduction; basic theory of operation of PNP and NPN transistor-l characteristics; CB; CE and CC configuration; different biasing techniques.

5. FET:
Introduction; Theory of operation; JFET Parameters; and JFET Amplifiers. MOSFET: Introduction; theory of operation; MOSFET parameters; application; graphical analysis of BJT and FET circuits; linear models of BJT and FET; pulse and large signal models of BJT and FET

6. BIASING TECHNIQUES OF FET:
Introductory idea of multistage and feedback amplifiers; base bias; emitter feedback bias; collector voltage divider bias; Load line and operating point.

7. INTEGRATED CIRCUIT:
Analysis of principle of integration. Introduction to Digital Integrated circuits; THYRISTORS: Introduction to thyristor family; SCR theory of operation; SCR characteristics and triggering; TRIAC: Theory of operation; Characteristics and control by SCR and TRIAC Introduction to op-amp; UJT: Introduction ; Basic theory of operation characteristics and structure; Complementary and programmable UJT relaxation oscillator.

TEXT BOOK

REFERENCE BOOKS

**Objective:** To strengthen the vocabulary and its application; to enhance grammatical and structural correctness of sentences while speaking & writing; to understand and apply the various business correspondence, and to enhance communication competency through various oral presentations

**UNIT 1:** Vocabulary:- A new set of 50 synonyms, antonyms, homophones & homonyms and to frame sentences; Phrasal verbs & idioms (30 each) and their usage in sentences

**UNIT 2:** Remedial grammar:- Parts of speech – conversion and special usage; Tenses & application; Sentence correction with respect to Parts of speech & tenses

**UNIT 3:** Spoken English:- Revises phonetic symbols; Transcription of words and simple sentences; Strategies for effective speaking; JAM on simple topics from daily life; Objectives & purposes of GD; GD on movies and campus related matters; Public speaking tips

**UNIT 4:** Comprehension:- Comprehending selected prose & poem, unseen passages and preparing précis; Note making; Summarizing; Viewing & reviewing movies, TV Programmes, books etc.

**UNIT 5:** Business correspondence:- Format of Business letter writing; Strategies for effective letter writing; Letter of business enquiry, complaint, adjustment and placing order

**UNIT 6:** Creative writing:- Composition based on cartoons, pictures, slogans etc.; Ad making; Introduction to brochure

**UNIT 7:** Soft Skills:- An introduction; Soft skills as corporate weapon; Role of ethics, integrity, values. trust and attitude in one’s life; GD & Case study based on the above components of personality.

**Prescribed Text book**
1. Technical Communication Principles & Practice (2nd Ed.) by Meenakshi Raman & Sangeeta Sharma published by Oxford University
2. The Functional Aspects of Communication Skills by Dr. Prajapati Prasad published by S.K. Kataria & Sons

**SUGGESTED READING:**
1. Language in Use (Upper intermediate Level, Adrian Doff Christopher Jones, Cambridge University Press
5. The sounds of English, Veena Kumar, Makaav Educational Software, New Delhi.

### CEA-101

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<tr>
<th><strong>ENVIROMENTAL SCIENCE AND ECOLOGY</strong></th>
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**OBJECTIVE**

Environmental Studies is a multidisciplinary area, the issues of which every one should know. The aim of the course is to make everyone aware of environmental issues like continuing problems of pollution, loss of forest, solid waste disposal, and degradation of environment. Issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity are other serious concerns before the mankind.

1. **THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:** Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; Causes of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principles involved in environmental education, environmental awareness, environmental ethics, environmental organization and their involvement.

2. **NATURAL RESOURCES:** Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

3. **ECOSYSTEMS:** Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological
succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem - forest ecosystem, grassland ecosystem, desert ecosystem and aquatic ecosystems.

4. BIODIVERSITY AND ITS CONSERVATION: Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

5. ENVIRONMENTAL POLLUTION: Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e-waste management; disaster management – floods, earthquake, cyclone and landslides.


7. HUMAN POPULATION AND THE ENVIRONMENT: Population growth, population explosion – family welfare programmes; role of information technology in environment and human health; case studies, Chipko movement, Saradar Sarovar dam, mining and quarrying in Udaipur, salinity and water logging in Punjab, Haryana and Rajasthan, Bhopal gas tragedy, Chernobyl nuclear disaster, arsenic pollution in ground water.

TEXT BOOK

REFERENCE BOOKS

1. The **General Chemistry lab** would have the following experiments. It is recommended that any ten experiments would be conducted out of these.

   (i) Determination of Ca++ and Mg++ hardness of water using EDTA solution
   (ii) Determination of alkalinity of water sample.
   (iii) Determination of dissolved oxygen (DO) in the given water sample
   (iv) To find the eutectic point for a two component system by using method of cooling curve.
   (v) Determination of viscosity of lubricant by Red Wood Viscosity (No. 1 & No. 2)
   (vi) To determine flash point & fire point of an oil by Pensky Marten’s flash point apparatus.
   (vii) To Prepare Phenol – formaldehyde and Urea formaldehyde resin.
   (viii) To find out saponification number of Oil
   (ix) To determine TDS of Water samples of different sources.
   (x) Determination of concentration of KMnO₄ solution spectrophotomerically
   (xi) Determination of strength of HCl solution by titrating against NaOH Solution conductometerically.
   (xii) To determine amount of sodium and potassium in a, given water sample by flame photometer.
   (xiii) Estimation of total iron in an iron alloy.

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**LIST OF EXPERIMENTS**

1. To determine the moment of inertia of a fly wheel about its axis of rotation.
2. To determine the moment of inertia of a given (irregular or regular) body with the help of inertia table.
3. To find the wavelength of sodium light by Newton’s rings experiment.
4. To determine the modulus of rigidity of a wire with the help of Maxwell’s needle.
5. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
6. To find the refractive index and Cauchy’s constants of a prism by using spectrometer.
7. To determine the modulus of rigidity of the material of wire with the help of Tortional pendulum.
8. To find the resolving power of a telescope.
9. To find the velocity of ultrasonic waves in nonconducting medium by piezo-electric method.
10. To find the specific rotation of sugar solution by using a Polarimeter.
11. To find the frequency of A.C. mains by using sonometer.
12. To find the wavelength of sodium light by Fresnel’s biprism experiment.
13. To find the pitch of a screw using He-Ne laser.

**TEXT BOOK**
1. Worshnop, B. L. and Flint, H. T. “Advanced Practical Physics”, KPH

**REFERENCE BOOKS**
1. Gupta, S. L. & Kumar, V. “Practical Physics”, Pragati Prakashan
3. Advanced Practical Physics; Worsnop and Flint, Methuen & Co., London,

**LIST OF EXPERIMENTS/EXERCISES**

1. Basic/Simple logic building
2. Handling mathematical calculations
3. Use of control structures
4. Use of Function
5. Handling mathematical problems
6. Array and Pointer
7. String Manipulation
8. Use of Structure and Union.
B.Tech. Degree Programme

10. File handling

Note: Write and run at least three programmes for each topic.

TEXT BOOK

1. Yashwant Kanitkar, ”Let Us C”, by BPB Publication.

REFERENCE BOOKS


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<tr>
<th>ME - 153</th>
<th>COMPUTER BASED ENGINEERING GRAPHICS</th>
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OBJECTIVE Engineering graphics is the primary medium for development and communicating design concepts. Through this course the students are trained in engineering Graphics concepts through manual drafting. The ISI code of practice is followed. With this course students can improve the visual concepts in all engineering streams.

1. INTRODUCTION: Need drawing instruments; geometrical drawing, conventional representation—indicating welds, Joints, surface texture, structural work etc.; various types of projections; first and third angle systems of orthographic projections.
2. **SIMPLE PROJECTS**: Projection of points in different quadrants; projections of, lines parallel to or inclined to one or both reference planes, true length of a line and its inclination with reference planes; traces of a line; concept of auxiliary plane.

3. **PROJECTIONS OF PLANES**: Parallel to one reference plane; inclined to one plane but perpendicular to the other, inclined to both reference planes.

4. **PROJECTIONS OF SOLIDS AND SOLIDS OF REVOLUTION**: In simple positions with axis perpendicular to a plane; with axis parallel to both planes; with axis parallel to one plane and inclined to the other.

5. **SECTIONS OF SOLIDS**: Prisms; pyramids; cylinders and cones; section plane is parallel, perpendicular and inclined to both reference planes; true shape of sections.

6. **DEVELOPMENT OF LATERAL SURFACES OF REGULAR SOLIDS**: Rectangular block; cylinder; cone; pyramid.

7. **ISOMETRIC VIEWS OF PLANES**: circle, square, rectangle; Isometric views of solids-prisms, pyramids and cylinders; principle of perspective projection, perspective of planes and solids.


3. SP 46-1988, Bureau of Indian Standards (BIS), New Delhi

**WEB REFERENCES**

1. www.technologystudent.com

2. www.animatedworksheets.co.uk

3. www.ider.herts.ac.uk/school/courseware

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<th>CE -151</th>
<th>ELEMENTS OF ENGINEERING LAB-I</th>
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LIST OF EXPERIMENTS

SURVEY LAB
1. Chain survey of a given area.
2. Plane Table & its accessories and utility.
3. Dumpy level & its used
4. Auto level.

GEOTECH LAB
5. Grain size distribution by sieve analysis.
6. Water content and visual classification by oven drying method.
7. Specific gravity of solids by pycnometer method.

ENVIRONMENT ENGG LAB
8. Determination of the alkalinity of a water sample.
9. Measure the hardness of a water sample.

CEMENT & CONCRETE LAB
10. Initial & final setting time of Cement & Concrete.

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1. LiqVid Basics – Each module should be cleared systematically and star the intermediate as time permits. Students are free to go at their pace with the module even away from the campus.
2. Conversation ability
3. Listening comprehension
4. Discussion on the various topics of Campus etiquettes
5. Oral presentation of views / ideas based on the given picture/ hint

Note: By the end of the first semester the student must be well versed in conversing effectively on given topics, expressing ideas based on the given picture/ clue, capable of preparing notes through listening and should know to behave and respond in a desired and positive manner anywhere in the campus.
Evaluation: Practical classes carry 10 marks which goes to the internal marks under the label Assignment. Marks are given as per the grades i.e. A+=10, A= 9, B+=8 and so on.

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LIST OF EXPERIMENTS
1. To study various forces and moments.
2. Prove polygon law of coplanar forces, experiments with pulley systems.
3. Find support reactions for simply supported beam
4. Find Forces in Truss elements
5. Measuring forces in members of jib crane.
6. Finding C.G. and MOI of various parts like connecting rod. Flywheel using various methods
7. To find mechanical advantage and mechanical efficiency of compound screw jack.
8. To study various simple machines including gear trains e.g. Wedge; clock; sewing machine, etc.
9. To conduct tensile test and determining ultimate tensile strength percentage elongation of steel specimen
10. To conduct compression test and determine compressive strength of specimen
11. To calculate VR, MA and efficiency of single, doubles and triple start worm and worm wheel
12. To study slider crank mechanism of 2 stroke and 4 stroke IC engine models
13. To study and analyze gear trains

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<th>ENA-152</th>
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Ten practical classes. Following activities are distributed:-
1. **English Edge Self learning Intermediate & Advanced programme** – Each module should be cleared systematically as time permits. Students are free to go at their pace with the module even while they are away from the campus.
2. **JAM** – Train the student to speak on the topic with clarity and confidence. They may be given sometime to write down the points and then to present it in front of the class.
3. **GD** – Give clear idea about the rules and purpose of GD, give a video clip on GD and discuss the merits and demerits, start with the most comfortable topic like
the discussion on the popularity of a movie or some topics which they all are very familiar with, give correct feedback; ensure the participation of each student.

4. **Interpretation** – Show video clips of cartoons/some interesting pictures and make students express their feelings orally in simple sentences. Make each student interpret the same picture and let them enjoy the variety of ideas. They have to record their thoughts in paper.

5. **Discussion** – Conduct discussion on the prescribed soft skills and let them do case studies and share their observations from the prominent corporate offices; Make them realize the importance of those soft skills in their personal life.

**Note:** By the end of the second semester the student must be well versed in expressing their thoughts independently, sharing their views in a group with confidence, to think freely and critically on any issue and to refine their personality with positive qualities.

Evaluation: Practical classes carry 10 marks which goes to the internal marks under the label Assignment. Marks are given as per the grades i.e. A+=10, A= 9, B+=8 and so on.

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<th>ME -152</th>
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**OBJECTIVE** To provide an overview of the basic production techniques and allied/supporting techniques used to produce finished products from raw materials. In addition to theory, students will be given practical training on various basic production techniques. After going through this course, the students will be in a position to understand the working of a mechanical workshop.

1. **INTRODUCTION:** Basic manufacturing processes and safety in workshop.

2. **ENGINEERING MATERIALS:** Classification of materials—their general mechanical properties and their selection

3. **CASTING PROCESSES:** Sand casting process; pattern making; types of moulding sands, cores, mould making, melting and pouring of metal; Casting defects.

4. **MACHINING PROCESSES:** Production of components involving turning; facing; taper turning; milling; shaping; planning and drilling operations.
5. **METAL FORMING PROCESSES:** Sheet metal forming operations; shearing, bending, punching and blanking, forging processes as upsetting, drawing down, bending etc.

6. **JOINING PROCESSES:** Metal arc welding; gas welding; resistance welding; soldering and mechanical fastening processes.

7. **FITTING AND MAINTENANCE:** Study of fitting tools, marking tools and measuring instruments like micrometer, vernier calipers and height gauge; introduction to some basic maintenance techniques/processes.


**NOTES**

1. In all sections of workshop, students will study about the tools used, different operations performed and main parts of the machine

2. Term final evaluation will be done on the basis of doing a practical job and viva-voce. There will be no theory paper on this subject.

**JOBS TO BE DONE**

A. **Machine Shop**
   1. To prepare a job on a lathe involving facing, turning, taper turning, step turning, radius making and parting off.
   2. To prepare horizontal surface/ vertical surface/ curved surface/ slot or v-grooves on a shaper / planer.
   3. To prepare a job involving side and face milling on a milling machine.
   4. To prepare a job involving drilling and tapping of holes.

B. **Sheet Metal Work**
   1. To draw layout, do marking and prepare a rectangular tray of sheet metal.
   2. To draw layout, do marking and prepare a funnel of sheet metal.

C. **Foundry**
   1. To prepare a single piece pattern mould, put metal in the mould and fettle the casting.
   2. To prepare a split piece pattern mould.

D. **Welding**
   1. To prepare joints (Lap and butt) by metal arc welding
   2. To prepare welded joint by resistance welding

E. **Fitting and Maintenance Jobs**
   1. Fitting jobs involving, chipping, filing, marking and measuring with precision instruments.
2. Maintenance and repair of common domestic appliances such as desert cooler, LPG stove, room heater, water tap, flush system, electric iron, scooter etc.

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<th>ELEMENTS OF ENGINEERING LAB - III</th>
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**LIST OF EXPERIMENTS**

1. To verify KCL and KVL.
2. To verify Thevenin’s and Norton’s Theorems.
3. To verify maximum power transfer theorem in D.C Circuit and A.C Circuit.
4. To verify Reciprocity and Superposition theorems.
5. To study frequency response of a series R-L-C circuit and determine resonant frequency and Q-Factor for various Values of R, L, C.
6. To study frequency response of a parallel R-L-C circuit and determine resonant frequency and Q-Factor for various values of R, L, C.
7. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
8. To perform open circuit and short circuit tests on a single-phase transformer determine the losses and efficiency.
9. To perform direct load test of a DC shunt generator and plot load voltage Vs load current curve.
10. To study various types of meters.
12. Measurement of power in a 3 phase system by two watt meter method.
13. Connection and testing of a single-phase energy meter (unit power factor load only).

**REFERENCE BOOKS**

List of Experiments-
1. To study V-I characteristics of diode; and its use as a capacitance.
2. Study of the characteristics of transistor in Common Base configuration.
3. Study of the characteristics of transistor in Common Emitter configuration.
4. Study of V-I characteristics of a photo-voltaic cell.
5. Study of characteristics of MOSFET/JFET is CS configuration.
6. To plot characteristics of thyristor.
7. To plot characteristics of UJT.
8. To plot characteristics of diac and Triac.
9. Introduction to Orcad PSPICE Software.
10. Simulation of semiconductor device circuits using Orcad PSPICE.