## SEMESTER II

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* Common to all B.E. / B.Tech. Programmes

+ Offering English Language Laboratory as an additional subject (with no marks) during 2nd semester may be decided by the respective Colleges affiliated to Anna University Chennai.

**A. CIRCUIT BRANCHES**

I Faculty of Electrical Engineering
1. B.E. Electrical and Electronics Engineering
2. B.E. Electronics and Instrumentation Engineering
3. B.E. Instrumentation and Control Engineering

II Faculty of Information and Communication Engineering
1. B.E. Computer Science and Engineering
2. B.E. Electronics and Communication Engineering
3. B.E. Bio Medical Engineering
4. B.Tech. Information Technology

**B. NON – CIRCUIT BRANCHES**

I Faculty of Civil Engineering
1. B.E. Civil Engineering

II Faculty of Mechanical Engineering
1. B.E. Aeronautical Engineering
2. B.E. Automobile Engineering
3. B.E. Marine Engineering
4. B.E. Mechanical Engineering
5. B.E. Production Engineering

III Faculty of Technology
1. B.Tech. Chemical Engineering
2. B.Tech. Biotechnology
3. B.Tech. Polymer Technology
4. B.Tech. Textile Technology
5. B.Tech. Textile Technology (Fashion Technology)
## SEMESTER III
(For the candidates admitted from the academic year 2008 – 2009 onwards)

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## SEMESTER –VIII
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AIM:
To encourage students to actively involve in participative learning of English and to help them acquire Communication Skills.

OBJECTIVES:
- To help students develop listening skills for academic and professional purposes.
- To help students acquire the ability to speak effectively in English in real-life situations.
- To inculcate reading habit and to develop effective reading skills.
- To help students improve their active and passive vocabulary.
- To familiarize students with different rhetorical functions of scientific English.
- To enable students write letters and reports effectively in formal and business situations.

UNIT I
Technical Vocabulary - meanings in context, sequencing words, Articles- Prepositions, intensive reading & predicting content, Reading and interpretation, extended definitions, Process description

Suggested activities:
1. Exercises on word formation using the prefix ‘self’ - Gap filling with preposition.
2. Exercises - Using sequence words.
3. Reading comprehension exercise with questions based on inference – Reading headings
4. and predicting the content – Reading advertisements and interpretation.
5. Writing extended definitions – Writing descriptions of processes – Writing paragraphs based on discussions – Writing paragraphs describing the future.

UNIT II

Suggested activities:
1. Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) - Reading comprehension exercises with texts including graphic communication - Exercises in interpreting non-verbal communication.
2. Listening comprehension exercises to categorise data in tables.
3. Writing formal letters, quotations, clarification, complaint – Letter seeking permission for Industrial visits– Writing analytical paragraphs on different debatable issues.

UNIT III
Cause and effect expressions – Different grammatical forms of the same word - Speaking – stress and intonation, Group Discussions - Reading – Critical reading - Listening, - Writing – using connectives, report writing – types, structure, data collection, content, form, recommendations.
Suggested activities:
1. Exercises combining sentences using cause and effect expressions – Gap filling exercises using the appropriate tense forms – Making sentences using different grammatical forms of the same word. (Eg: object-verb/object-noun)
2. Speaking exercises involving the use of stress and intonation – Group discussions– analysis of problems and offering solutions.
3. Reading comprehension exercises with critical questions, Multiple choice question.

UNIT IV

Numerical adjectives – Oral instructions – Descriptive writing – Argumentative paragraphs – Letter of application - content, format (CV / Bio-data) - Instructions, imperative forms - Checklists, Yes/No question form – E-mail communication.

Suggested Activities:
1. Rewriting exercises using numerical adjectives.
2. Reading comprehension exercises with analytical questions on content – Evaluation of content.
3. Listening comprehension – entering information in tabular form, intensive listening exercise and completing the steps of a process.
4. Speaking - Role play – group discussions – Activities giving oral instructions.

UNIT V

Speaking - Discussion of Problems and solutions - Creative and critical thinking – Writing an essay, Writing a proposal.

Suggested Activities:
1. Case Studies on problems and solutions
2. Brain storming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements.

TOTAL: 60 PERIODS

TEXT BOOK:

REFERENCES:

EXTENSIVE READING:
NOTE:
The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.

MA2161 MATHEMATICS – II

UNIT I ORDINARY DIFFERENTIAL EQUATIONS
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT II VECTOR CALCULUS

UNIT III ANALYTIC FUNCTIONS
Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : w = z+c, cz, 1/z, and bilinear transformation.

UNIT IV COMPLEX INTEGRATION

UNIT V LAPLACE TRANSFORM

Definition of Inverse Laplace transform as contour integral – Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

TOTAL: 60 PERIODS

TEXT BOOKS:
**REFERENCES:**

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**PH2161 ENGINEERING PHYSICS – II**

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**UNIT I CONDUCTING MATERIALS**


**UNIT II SEMICONDUCTING MATERIALS**


**UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS**


Superconductivity : properties - Types of super conductors – BCS theory of superconductivity(Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

**UNIT IV DIELECTRIC MATERIALS**


**UNIT V MODERN ENGINEERING MATERIALS**

Metallic glasses: preparation, properties and applications.
Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, advantages and disadvantages of SMA

**TOTAL: 45 PERIODS**
TEXT BOOKS:
2. Charles P. Poole and Frank J. Owen, ‘Introduction to Nanotechnology’, Wiley India (2007) (for Unit V)

REFERENCES:

CY2161 ENGINEERING CHEMISTRY – II L T P C
3 0 0 3

AIM
To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

OBJECTIVES
• The student should be conversant with the principles electrochemistry, electrochemical cells, emf and applications of emf measurements.
• Principles of corrosion control
• Chemistry of Fuels and combustion
• Industrial importance of Phase rule and alloys
• Analytical techniques and their importance.

UNIT I ELECTROCHEMISTRY
Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nemst equation (problem) – reference electrodes – Standard Hydrogen electrode -Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox - Fe²⁺ vs dichromate and precipitation – Ag⁺ vs Cl⁻ titrations) and conduct metric titrations (acid-base – HCl vs, NaOH) titrations,

UNIT II CORROSION AND CORROSION CONTROL
UNIT III FUELS AND COMBUSTION

UNIT IV PHASE RULE AND ALLOYS

UNIT V ANALYTICAL TECHNIQUES

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

ME2151 ENGINEERING MECHANICS
L T P C
3 1 0 4

OBJECTIVE
At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.
UNIT I BASICS & STATICS OF PARTICLES 12

UNIT II EQUILIBRIUM OF RIGID BODIES 12

UNIT III PROPERTIES OF SURFACES AND SOLIDS 12

UNIT IV DYNAMICS OF PARTICLES 12

UNIT V FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS 12
Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion.

TOTAL: 60 PERIODS

TEXT BOOK:

REFERENCES:
UNIT I BASIC CIRCUITS ANALYSIS

UNIT II NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS:
Network reduction: voltage and current division, source transformation – star delta conversion.
Thevenins and Novton & Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

UNIT III RESONANCE AND COUPLED CIRCUITS

UNIT IV TRANSIENT RESPONSE FOR DC CIRCUITS
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. with sinusoidal input.

UNIT V ANALYSING THREE PHASE CIRCUITS
Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & un balanced – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
UNIT I CIRCUIT ANALYSIS TECHNIQUES

UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS

UNIT III SEMICONDUCTOR DIODES

UNIT IV TRANSISTORS
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET – drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

UNIT V SPECIAL SEMICONDUCTOR DEVICES (Qualitative Treatment only)

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
UNIT I  ELECTRICAL CIRCUITS & MEASUREMENTS  12
Ohm’s Law – Kirchoff’s Laws – Steady State Solution of DC Circuits – Introduction to AC
Circuits – Waveforms and RMS Value – Power and Power factor – Single Phase and
Three Phase Balanced Circuits.

Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and
Voltmeters), Dynamometer type Watt meters and Energy meters.

UNIT II  ELECTRICAL MECHANICS  12
Construction, Principle of Operation, Basic Equations and Applications of DC
Generators, DC Motors, Single Phase Transformer, single phase induction Motor.

UNIT III  SEMICONDUCTOR DEVICES AND APPLICATIONS  12
Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its
Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation.

Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics –
Elementary Treatment of Small Signal Amplifier.

UNIT IV  DIGITAL ELECTRONICS  12
Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-
Flops – Registers and Counters – A/D and D/A Conversion (single concepts)

UNIT V  FUNDAMENTALS OF COMMUNICATION ENGINEERING  12
Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles
of Amplitude and Frequency Modulations.

Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fibre (Block
Diagram Approach only).

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
(2005).
UNIT I
SURVEYING AND CIVIL ENGINEERING MATERIALS


UNIT II
BUILDING COMPONENTS AND STRUCTURES

Foundations: Types, Bearing capacity – Requirement of good foundations.


TOTAL: 30 PERIODS

UNIT III
POWER PLANT ENGINEERING


UNIT IV
IC ENGINES

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

UNIT V
REFRIGERATION AND AIR CONDITIONING SYSTEM


TOTAL: 30 PERIODS

REFERENCES:
**GE2155**  
**COMPUTER PRACTICE LABORATORY – II**  
**L T P C**  
0 1 2 2

**LIST OF EXPERIMENTS**

1. **UNIX COMMANDS**  
   Study of Unix OS - Basic Shell Commands - Unix Editor
2. **SHELL PROGRAMMING**  
   Simple Shell program - Conditional Statements - Testing and Loops
3. **C PROGRAMMING ON UNIX**  
   Dynamic Storage Allocation-Pointers-Functions-File Handling

**TOTAL: 45 PERIODS**

**HARDWARE / SOFTWARE REQUIREMENTS FOR A BATCH OF 30 STUDENTS**

**Hardware**

1. 1 UNIX Clone Server
2. 33 Nodes (thin client or PCs)
3. Printer – 3 Nos.

**Software**

1. OS – UNIX Clone (33 user license or License free Linux)
2. Compiler - C

**GS2165**  
**PHYSICS LABORATORY – II**  
**L T P C**  
0 0 3 2

**LIST OF EXPERIMENTS**

1. Determination of Young’s modulus of the material – non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
5. Spectrometer dispersive power of a prism.
6. Determination of Young’s modulus of the material – uniform bending.
• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.
• The lab examinations will be held only in the second semester.

GS2165 CHEMISTRY LABORATORY – II
L T P C
0 0 3 2

LIST OF EXPERIMENTS
1. Conduct metric titration (Simple acid base)
2. Conduct metric titration (Mixture of weak and strong acids)
3. Conduct metric titration using BaCl₂ vs Na₂SO₄
4. Potentiometric Titration (Fe²⁺ / KMnO₄ or K₂Cr₂O₇)
5. PH titration (acid & base)
6. Determination of water of crystallization of a crystalline salt (Copper sulphate)
7. Estimation of Ferric iron by spectrophotometry.

• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.
• The lab examinations will be held only in the second semester.

ME2155 COMPUTER AIDED DRAFTING AND MODELING LABORATORY
L T P C
0 1 2 2

List of Exercises using software capable of Drafting and Modeling
1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using B spline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building ( Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.
Note: Plotting of drawings must be made for each exercise and attached to the records written by students.

**List of Equipments for a batch of 30 students:**

1. Pentium IV computer or better hardware, with suitable graphics facility - 30 No.
2. Licensed software for Drafting and Modeling. – 30 Licenses
3. Laser Printer or Plotter to print / plot drawings – 2 No.

**TOTAL: 45 PERIODS**

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**EE2155 ELECTRICAL CIRCUIT LABORATORY**

(Common to EEE, EIE and ICE)

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**LIST OF EXPERIMENTS**

1. Verification of ohm’s laws and kirchoff’s laws.
2. Verification of Thevemin’s and Norton’s Theorem
3. Verification of superposition Theorem
4. Verification of maximum power transfer theorem.
5. Verification of reciprocity theorem
6. Measurement of self inductance of a coil
7. Verification of mesh and nodal analysis.
8. Transient response of RL and RC circuits for DC input.
10. Frequency response of single tuned coupled circuits.

**TOTAL: 45 PERIODS**

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**EC2155 CIRCUITS AND DEVICES LABORATORY**

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1. Verification of KVL and KCL
2. Verification of Thevenin and Norton Theorems.
3. Verification of superposition Theorem.
4. Verification of Maximum power transfer and reciprocity theorems.
5. Frequency response of series and parallel resonance circuits.
6. Characteristics of PN and Zener diode
7. Characteristics of CE configuration
8. Characteristics of CB configuration
9. Characteristics of UJT and SCR
10. Characteristics of JFET and MOSFET


TOTAL: 45 PERIODS

ENGLISH LANGUAGE LABORATORY (Optional)

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1. **Listening:**
   - Listening & answering questions – gap filling – Listening and Note taking - Listening to telephone conversations
   - 5

2. **Speaking:**
   - Pronouncing words & sentences correctly – word stress – Conversation practice.
   - 5

**Classroom Session**

2. Goal setting – interviews – stress time management – situational reasons

**Evaluation**

(1) Lab Session – 40 marks
   - Listening – 10 marks
   - Speaking – 10 marks
   - Reading – 10 marks
   - Writing – 10 marks

(2) Classroom Session – 60 marks
   - Role play activities giving real life context – 30 marks
   - Presentation – 30 marks

**Note on Evaluation**

1. Examples for role play situations:
   a. Marketing engineer convincing a customer to buy his product.
   b. Telephone conversation – Fixing an official appointment / Enquiry on availability of flight or train tickets / placing an order. etc.
2. Presentations could be just a Minute (JAM activity) or an Extempore on simple topics or visuals could be provided and students could be asked to talk about it.

**REFERENCES:**

LAB REQUIREMENTS
1. Teacher – Console and systems for students
2. English Language Lab Software
3. Tape Recorders.

MA2211   TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS   L T P C

3 1 0 4
(Common to all B.E. / B.Tech. Degree Programmes)

OBJECTIVES
The course objective is to develop the skills of the students in the areas of Transforms and Partial Differential Equations. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT I  FOURIER SERIES  9 + 3

UNIT II  FOURIER TRANSFORMS  9 + 3

UNIT III  PARTIAL DIFFERENTIAL EQUATIONS  9 +3
Formation of partial differential equations – Lagrange’s linear equation – Solutions of standard types of first order partial differential equations - Linear partial differential equations of second and higher order with constant coefficients.

UNIT IV  APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS  9 + 3
Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in cartesian coordinates.

UNIT V  Z -TRANSORMS AND DIFFERENCE EQUATIONS  9 + 3

TOTAL (L:45+T:15): 60 PERIODS

TEXT BOOK:

REFERENCES:

CE3202 MECHANICS OF SOLIDS  L  T  P  C 3 1 0 4

OBJECTIVES
The objective of the course is to understand the various materials strength in the form of Stresses, strains, shear force and bending moment. The course will also used to study the loads in columns, torsion and complex Stresses.

UNIT I STRESS AND STRAIN

UNIT II SHEAR FORCE AND BENDING MOMENT DIAGRAMS AND STRESS IN BEAMS
Beams and Bending- Types of loads, supports – Shear Force and Bending Moment Diagrams for statically determinate beam with concentrated load, UDL, uniformly varying load. Theory of Simple Bending – Analysis of Beams for Stresses – Stress Distribution at a cross Section due to bending moment and shear force for Cantilever, simply supported and overhanging beams with different loading conditions.

UNIT III COLUMNS
Eccentrically loaded short columns – middle third rule – core section – columns of unsymmetrical sections – (angle, channel sections) – Euler’s theory of long columns – critical loads for prismatic columns with different end conditions; Rankine-Gordon formula for eccentrically loaded columns

UNIT IV TORSION

UNIT V COMPLEX STRESSES
2 D State of Stress – 2 D Normal and Shear Stresses on any plane – Principal Stresses and Principal Planes – Graphical Method

PLANE TRUSSES: Analysis of Plane Trusses – Method of Joints – Method of Sections

LECTURES: 45 TUTORIALS : 15 TOTAL : 60 PERIODS
TEXT BOOKS


REFERENCES :


CE3201 FLUID MECHANICS

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OBJECTIVES

To understand the basic properties of the fluid, fluid kinematics, fluid dynamics and to analyse and appreciate the complexities involved in solving the fluid flow problems.

UNIT I FLUID PROPERTIES AND FLUID STATICS

Fluid – definition, distinction between solid and fluid - Units and dimensions - Properties of fluids - density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapour pressure, capillarity and surface tension - Fluid statics: concept of fluid static pressure, absolute and gauge pressures - pressure measurements by manometers and pressure gauges.

UNIT II FLUID KINEMATICS

Fluid Kinematics - Flow visualization - lines of flow - types of flow - velocity field and acceleration - continuity equation (one and three dimensional differential forms)- Equation of streamline - stream function - velocity potential function - circulation - flow net.

UNIT III FLUID DYNAMICS

Fluid dynamics - equations of motion - Euler’s equation along a streamline - Bernoulli’s equation – applications - Venturi meter, Orifice meter, Pitot tube – flow through weirs and notches.

UNIT IV FLOW THROUGH PIPES

Viscous flow - Navier-Stoke’s equation (Statement only) - Shear stress, pressure gradient relationship - laminar flow between parallel plates - Laminar flow through circular tubes (Hagen poiseulle’s) - Hydraulic and energy gradient - flow through pipes - Darcy-weisbach's equation - pipe roughness -friction factor- Moody’s diagram.
UNIT V  BOUNDARY LAYER


TOTAL: 45 PERIODS

TEXT BOOKS:


REFERENCES:


CE3206 SURVEYING L T P C
3 0 0 3

OBJECTIVES

At the end this course the student will posses the basic knowledge about the various surveying instruments and various surveying techniques.

UNIT I  INTRODUCTION AND CHAIN SURVEYING


UNIT II  COMPASS AND PLANE TABLE SURVEYING


UNIT III  LEVELLING AND APPLICATIONS

Levelling Instruments - Spirit level - Sensitiveness - Bench marks - Temporary and permanent adjustments – Fly, Check, Profile and block levelling - Booking - Reduction - Curvature and refraction - Reciprocal levelling - Longitudinal and cross sections - Plotting - Calculation of areas and volumes - Contouring - Methods - Characteristics and uses of contours.
UNIT IV TACHEOMETRIC SURVEYING

UNIT V CONTROL SURVEYING

TOTAL: 45 PERIODS

TEXT BOOKS :

REFERENCES :

EN3205 ENVIRONMENTAL CHEMISTRY AND MICROBIOLOGY

OBJECTIVES
The objectives of the course are to study the basics of environmental chemistry, chemical reactions involved in water and electrokinetic properties. Also the students are able to understand the basic microbiological concepts related to Environmental Engineering.

UNIT I ENVIRONMENTAL CHEMISTRY: INTRODUCTION
Chemical kinetics - factors influencing the rate – order and molecularity (examples) – derivation of rate constant for first order reaction - time for half - change - nature of BOD reactions – consecutive reactions in water treatment – Enzyme reactions, temperature dependence, catalyst.

UNIT II CHEMICAL REACTIONS OF WATER
UNIT III ORGANIC COMPOUNDS AND STRUCTURES
Functional groups in organic compounds and their structures (Preparation & Properties not required) - carbohydrates - classification – monosaccharides, pentoses (Xylose and arabinose) Hexoses (Glucose, galactose, mannose and fructose) – disaccharides (Sucrose, maltose and lactose) – Polysaccharides (Starch, cellulose and hemicellulose) - Structural formulae - ring structure and hydrolysis reaction only.

UNIT IV MICROBIOLOGY: GENERAL
Classification of living organisms with special emphasis on micro-organisms - characteristics - application in environmental engineering - DNA & RNA.

METHODS OF STUDY

UNIT V GROWTH AND METABOLISM OF MICRO-ORGANISMS

RESPIRATIONS
Aerobic and anaerobic - role of enzymes - bacterial respiration - fermentation and saprogenic action - basic concepts of molecular biology.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES
To understand the basic concepts of environmental issues, evolution, biodiversity and impacts on human health, internal and external earth structures and climate changes.

UNIT I   ENVIRONMENTAL ISSUES

UNIT II   EVOLUTION

UNIT III   BIODIVERSITY

UNIT IV   EARTH STRUCTURE

UNIT V   CLIMATE CHANGE AND WATER RESOURCES MANAGEMENT

TOTAL: 45 PERIODS

TEXT BOOKS :
REFERENCES:

CE3208 FLUID MECHANICS AND STRENGTH OF MATERIALS LABORATORY

OBJECTIVES
The experimental work involved in this laboratory shall make the student understand the basic concepts of fluid mechanics, mainly flow through pipes and the structural properties of the materials used for construction.

LIST OF EXPERIMENTS
Fluid Mechanics Laboratory
1. Determination of co-efficient of discharge for orifice
2. Determination of co-efficient of discharge for notches
3. Determination of co-efficient of discharge for venturimeter
4. Determination of co-efficient of discharge for orifice meter
5. Study of friction losses and minor losses in pipes
6. Determination of co-efficient of discharge for weirs
7. Verification of Bernoulli’s theorem

Strength of Materials Laboratory
1. Test involving axial compression
2. Test involving axial tension
3. Test involving torsion
4. Deflection test
5. Tests on springs
6. Hardness tests
7. Tests on wood

The student should learn the use of deflectometer, extensometer, compressometer and strain gauges, weirs and notches, orifice meter, venturimeter etc.

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS
(For a batch of 30 students)
1. Bernoulli’s theorem – Verification Apparatus - 1 No.
2. Calculation of Metacentric height water tank  -  1 No.
   Ship model with accessories  -  1 No.
4. Flow measurement open channel flow
   (i) Channel with provision for fixing notches
       (rectangular, triangular & trapezoidal forms)  -  1 Unit
   (ii) Flume assembly with provisions for conducting experiments on Hydraulic jumps, generation of surges etc.  -  1 Unit
5. Flow measurement in pipes
   (i) Venturimeter, U tube manometer fixtures like Valves, collecting tank  -  1 Unit
   (ii) Orifice meter, with all necessary fittings in pipe lines of different diameters  -  1 Unit
   (iii) Calibration of flow through orifice tank with Provisions for fixing orifices of different shapes, collecting tank  -  1 Unit
   (iv) Calibration of flow through mouth piece Tank with provisions for fixing mouth pieces Viz. external mouth pieces & internal mouth piece, Borda’s mouth piece  -  1 Unit
6. Losses in Pipes
   Major loss – Friction loss
   Pipe lengths (min. 3m) of different diameters with Valves and pressure tapping & collecting tank  -  1 Unit
   Minor Losses
   Pipe line assembly with provisions for having Sudden contractions in diameter, expansions, bends, elbow etc.- 1 unit
7. U T M of minimum 400 kN capacity  -  1 No.
8. Torsion testing machine for steel rods  -  1 No.
9. Izod impact testing machine  -  1 No.
10. Hardness testing machine  -  1 each
    Rockwell
    Vicker’s (any 2)
    Brinell
12. Extensometer  -  1 No.
13. Compressometera  -  1 No.
14. Dial gauges  -  Few
OBJECTIVES
At the end of this course the student will possess knowledge about various Survey field techniques and shall know about the basic surveying instruments.

LIST OF EXPERIMENTS
1. Study of chains and its accessories
2. Aligning, Ranging and Chaining
3. Chain Traversing
4. Compass Traversing
7. Study of levels and levelling staff
8. Fly levelling using Dumpy level
9. Fly levelling using tilting level
10. Check levelling
11. LS and CS
12. Contouring

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS
(For a batch of 30 students)

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>DESCRIPTION OF EQUIPMENTS</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Theodolites</td>
<td>Atleast 1 for every 10 students</td>
</tr>
<tr>
<td>2.</td>
<td>Dumpy level</td>
<td>Atleast 1 for every 10 students</td>
</tr>
<tr>
<td>3.</td>
<td>Plain table</td>
<td>Atleast 1 for every 10 students</td>
</tr>
<tr>
<td>4.</td>
<td>Pocket stereoscope</td>
<td>1 no.</td>
</tr>
<tr>
<td>5.</td>
<td>Ranging rods</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Leveling staff</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Cross staff</td>
<td>1 for a set of 5 students</td>
</tr>
<tr>
<td>8.</td>
<td>Chains</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Tapes</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Arrows</td>
<td></td>
</tr>
</tbody>
</table>

CE3210  ENVIRONMENTAL ENGINEERING LABORATORY – I  
OBJECTIVES
To understand the sampling and preservation methods and to understand the analysis of water.
LIST OF EXPERIMENTS
1. Determination of pH and turbidity
2. Determination of Hardness
3. Determination of iron & fluoride in water
4. Determination of residual chlorine in water
5. Determination of Chlorides
6. Determination of Alkalinity/Acidity
7. Determination of Sulphate
8. Determination of Optimum Coagulant Dosage
9. Determination of available Chlorine in Bleaching powder
10. Determination of dissolved oxygen in water
11. Determination of suspended, volatile and fixed solids

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS
(For a batch of 30 students)
1. pH meter - 1 No.
2. Turbidity meter - 1 No.
3. Conductivity meter - 1 No.
4. Refrigerator - 1 No.
5. BOD incubator - 1 No.
6. Muffle furnace - 1 No.
7. Hot air oven - 1 No.
8. Magnetic stirrer with hot plates - 5 Nos.
11. Water bath - 1 No.
12. Furniture - 1 lot
13. Glass wares / Crucibles - 1 lot
14. Chemicals - 1 lot
15. COD apparatus - 1 No.
17. Calorimeter - 1 No.
18. Colour comparator - 1 No.
25. Filtration assembly - 1 No.
AIM:
This course aims at providing the required skill to apply the statistical tools in engineering problems.

OBJECTIVES:
- The students will have a fundamental knowledge of the concepts of probability.
- Have knowledge of standard distributions which can describe real life phenomenon.
- Have the notion of sampling distributions and statistical techniques used in management problems.

UNIT I  RANDOM VARIABLES  9 + 3
Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II  TWO-DIMENSIONAL RANDOM VARIABLES  9 + 3
Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III  TESTING OF HYPOTHESIS  9 + 3

UNIT IV  DESIGN OF EXPERIMENTS  9 + 3
Completeness randomized design – Randomized block design – Latin square design - 22 - factorial design.

UNIT V  STATISTICAL QUALITY CONTROL  9 + 3
Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

T : 45 + 15 , TOTAL : 60 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVES
To understand the basic properties and strength nature of various soils and their settlement behaviour in foundations.

UNIT I SOIL PROPERTIES AND COMPACTION OF SOIL

UNIT II SOIL MOISTURE – PERMEABILITY, STRESSES IN SOILS

UNIT III SHEAR STRENGTH AND SLOPE STABILITY

UNIT IV SOIL EXPLORATION

UNIT V FOUNDATION – BEARING CAPACITY AND SETTLEMENT

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

CE3212 APPLIED HYDRAULICS AND FLUID MACHINES L T P C
3 0 0 3

OBJECTIVES
The objective of the course is to understand the types of flow in open channel, dimensional analysis, momentum principle and application of various turbines and pumps in fluid problems.

UNIT I OPEN CHANNEL FLOW

UNIT II DIMENSIONAL ANALYSIS
Dimensional Homogeneity – Rayleigh’s and Buckingham methods – model study and similitude – Non- dimensional numbers and its significance – scale effect and distorted model.

UNIT III MOMENTUM PRINCIPLE
Impulse momentum equation – Application of linear momentum principle – Impact of Jet- Force exerted by a jet on normal, inclined and curved surfaces for stationary and moving cases – Angular momentum principle – construction of velocity vector diagrams – forces on pipe bends.

UNIT IV HYDRAULIC TURBINES

UNIT V HYDRAULIC PUMPS

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

OBJECTIVES
At the end of this course the student will posses knowledge about ecology, ecosystems and its types and about the various biogeochemical cycles.

UNIT I INTRODUCTION
Ecology – its relevance to civilization – levels of organization hierarchy – concept of ecosystem – structure of ecosystem – study of ecosystems – communities in ecosystem – energy flow and material cycling – productivity in ecosystems - examples of ecosystems.

UNIT II ECOSYSTEMS
Classification of ecosystems - Principles and components of Systems - Structural and functional interactions in environmental systems - Human modifications of environmental systems.

UNIT III BIOGEOCHEMICAL CYCLES
Biogeochemical cycles – patterns and basic types – the nitrogen cycle - the phosphorus cycle – the sulphur cycle – the global cycling of carbon and water – nutrient cycling.

UNIT IV NATURAL ECOSYSTEMS

UNIT V FRESH WATER ECOSYSTEMS
Fresh water ecosystems – Lentic ecosystems – Lotic ecosystems – marshes and swamps location – importance – identifying life form – special features – marine ecosystems.

TOTAL: 45 PERIODS

TEXT BOOKS:
OBJECTIVES
The course objective is to identify the sources and quantity of surface and ground water bodies and their demand for the public and also to study the quality of water and their treatment techniques.

UNIT I PUBLIC WATER SUPPLY SCHEMES AND QUANTITY OF WATER 9
Necessary and objectives of public water supply schemes – planning and financing – Quantity of water – water requirements – continuous and intermittent supply – rate of demand – variations in rate of demand- its effect on design – design periods and capacities of different components – population growth and forecast – estimating the quantity of water required.

UNIT II HYDROLOGICAL CONCEPTS AND SOURCES OF WATER 9

UNIT III QUALITY OF WATER AND TRANSPORTATION OF WATER 9

UNIT IV PURIFICATION OF WATER 9
Treatment of water- working principles, Purpose and design of all the unit process of water treatment – screening – plain sedimentation – coagulation sedimentation – filtration – disinfection – water softening.
UNIT V OTHER TREATMENTS AND DISTRIBUTION OF WATER


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CE3216 INDUSTRIAL SAFETY L T P C
3 0 0 3

OBJECTIVES
To understand the basic needs of safety in human health, environmental safety, electrical safety, safety against accidents and fire safety.

UNIT I INTRODUCTION

UNIT II SAFETY ON HEALTH
UNIT III  ELECTRICAL SAFETY  9
Safe limits of amperages, voltages, distance from lines, etc. - Joints and connections - Overload and Short circuit protection - Earthing standards and earth fault protection - Protection against voltage fluctuations - Effects of shock on human body - Hazards from Borrowed neutrals - Electrical equipment in hazardous atmosphere - Criteria in their selection, installation, maintenance and use - Control of hazards due to static electricity.

UNIT IV  SAFETY AGAINST ACCIDENTS  9
Theories and principles of accident Causation - The effects of accident - Unsafe Act - Unsafe condition - Unpredictable performance - Consequences of accident - Accident prevention programs – Accident investigation and analysis – OSHA principle and concept – safety measures in factory act.

UNIT V  FIRE PROTECTION  9
General causes and classification of fire - Detection of fire - extinguishing methods - fire fighting installations with and without water - Machine guards and its types – automation - High pressure hazards, safety, emptying, inspecting, repairing - hydraulic and nondestructive testing - hazards and control in mines.

TOTAL: 45 PERIODS

TEXT BOOKS :

REFERENCES :

CE3220  FLUID MACHINERY LABORATORY  L  T  P  C
0  0  3  2

OBJECTIVES
The experimental work involved in this laboratory should make the student to study the performances of Rotodynamic and positive displacement pumps and load tests on impulse and reaction turbines.

LIST OF EXPERIMENTS
1. Conducting experiments and drawing the characteristic curves of Monoblock Centrifugal pump
2. Conducting experiments and drawing the characteristic curves of Coupled Centrifugal pump
3. Conducting experiments and drawing the characteristic curves of Submersible pump
4. Conducting experiments and drawing the characteristic curves of Jet pump.
5. Conducting experiments and drawing the characteristic curves of Reciprocating pump.
6. Conducting experiments and drawing the characteristic curves of Gear pump.
7. Conducting experiments and drawing the characteristic curves of Pelton wheel.
8. Conducting experiments and drawing the characteristic curves of Francis turbine.
9. Conducting experiments and drawing the characteristic curves of Kaplan turbine.
10. Impact of jet on flat plate (Normal / Inclined)

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS

(For a batch of 30 students)

1. Monoblock Centrifugal pump setup
2. Coupled Centrifugal pump setup
3. Submersible pump setup
4. Jet pump setup
5. Reciprocating pump setup
6. Gear pump setup
7. Pelton wheel turbine setup
8. Francis turbine setup
9. Kaplan turbine setup
10. Impact of Jet on vane setup

Quantity: one each

EN3217 ENVIRONMENTAL ENGINEERING LABORATORY – II L T P C
0 0 3 2

OBJECTIVES
To understand the sampling and preservation methods and significance of characterization of wastewater.

LIST OF EXPERIMENTS
1. Determination of Chlorides in wastewater.
3. Determination of Sulphate in wastewater.
4. Precipitation process for treating waste water
5. Determination of suspended, volatile, fixed and settleable solids in wastewater.
6. B.O.D. test
7. C.O.D. test
13. Determination of Calcium, Potassium and Sodium.
   (Demonstration only)

TOTAL: 45 PERIODS
LIST OF EQUIPMENTS

(For a batch of 30 students)

1. Oxygen analyzer
2. Spectrophotometer
3. Ion – selective electrode
4. Sodium Potassium Analyzer – Flame Photometer
5. Gas Chromatography
6. Atomic absorption spectroscopy (Ni, Zn, Pb)
7. Nephlo - turbidimeter
8. BOD Analyser
9. COD Analyser

Quantity: one each

EN3218 MICROBIOLOGY LABORATORY L T P C
0 0 3 2

OBJECTIVES
To understand the experimental procedures involved in the study of micro-organisms and the method of testing their presence.

1. Sampling Techniques
2. Sterilization Techniques
3. Preparation of culture media
4. Isolation of micro-organisms (Air, water, soil, sediment)
5. Isolation of anaerobic sediments (Sewage sediments)
6. Isolation of yeast (Sediment)
7. Purification of micro-organisms
8. Cultural characteristics of bacteria
9. Simple staining
10. Negative staining
11. Differential staining
12. Acid-fast staining
13. Coliform test
14. MPN test

TOTAL: 45 PERIODS
LIST OF EQUIPMENTS

(For a batch of 30 students)

1. Incubator - 1 No.
2. Incubator Shaker - 3 Nos.
3. Microscopes - 5 Nos.
4. Micropipettes - 3 in each volume
5. Colony counter - 1 No.
7. Laminar hood - 1 No.
8. Chemicals - 1 lot
10. Innoculum loops - 5 Nos.
13. Staining Kit - 5 Nos.
14. Refrigerator - 1 No.

EN3301 SOLID WASTE MANAGEMENT L T P C

UNIT I MANAGEMENT SYSTEM, GENERATION AND ONSITE PROCESSING 9

UNIT II COLLECTION AND TRANSFER OF SOLID WASTES 9

UNIT III PROCESSING TECHNIQUES AND RECOVERY OF ENERGY 9

UNIT IV REFUGE DISPOSAL 9
UNIT V  COMPOSTING

TOTAL: 45 PERIODS

REFERENCES

EN3302  AIR POLLUTION AND CONTROL  L T P C
UNIT I  GENERAL  3 0 0 3
Atmosphere as a place of disposal of pollutants – Air Pollution – Definition - Air Pollution and Global Climate - Units of measurements of pollutants - Air quality criteria - emission standards - National ambient air quality standards - Air pollution indices - Air quality management in India.

UNIT II  SOURCES, CLASSIFICATION AND EFFECTS  9
Sources and classification of air pollutants - Man made - Natural sources - Type of air pollutants - Pollution due to automobiles - Analysis of air pollutants - Chemical, Instrumental and biological methods.
Air pollution and its effects on human beings, plants and animals - Economic effects of air pollution - Effect of air pollution on meteorological conditions - Changes on the Meso scale, Micro scale and Macro scale.

UNIT III  SAMPLING, METEOROLOGY AND AIR QUALITY MODELLING  9
Sampling and measurement of particulate and gaseous pollutants - Ambient air sampling - Stack sampling. Environmental factors - Meteorology - temperature lapse rate and stability – Adiabatic lapse rate - Wind Rose - Inversion – Wind velocity and turbulence - Plume behaviour - Dispersion of air pollutants.

UNIT IV  AIR POLLUTION CONTROL MEASURES  9
Control - Source correction methods - Control equipments - Particulate control methods – Bag house filter - Settling chamber - cyclone separators - inertial devices - Electrostatic precipitator - scrubbers - Control of gaseous emissions - Absorption - Absorption equipments - adsorption and combustion devices (Theory and working of equipments only).
UNIT V  AIR POLLUTION SURVEY, LEGISLATIONS AND CASE STUDIES  9

TOTAL: 45 PERIODS

REFERENCES

EN3303  WASTEWATER ENGINEERING – I  L T P C
3 0 0 3

UNIT I  QUANTITY, COLLECTIONS AND CONVEYANCE  9

UNIT II  QUALITY OF SEWAGE AND PRIMARY TREATMENT  9
Characteristics and composition of sewage - physical and chemical analysis - DO, BOD,COD and their significance - cycles of decomposition - Objectives and basic principles of sewage treatment - primary treatment - screens - Grit chamber - settling tank - principles of sedimentations - Design of settling tanks.

UNIT III  BIOLOGICAL TREATMENT OF SEWAGE  9
Basic principles of biological treatment - Filtration - contact beds - Sand Filters - trickling filters - Description and principles of operation of standards / high rate filters - recirculation - activated sludge process - diffuser / Mechanical aeration - Conventional, high rate and extended aeration process - oxidation pond - stabilization ponds - aerated lagoons.
UNIT IV SLUDGE MANAGEMENT
Objectives of sludge treatment - properties and characteristics of sludge - Thickening - sludge digestion - drying beds - conditioning and dewatering - sludge disposal - Eutrophication - recycle & reuse of waste effluents - elutriation

UNIT V SEWAGE DISPOSAL AND HOUSE DRAINAGE
Methods - dilution method - self purification of streams - oxygen sag curve - land disposal - sewage farming.
House drainage - Sanitary fixtures / fittings - one pipe system, two pipe system, etc. - General layout of house drainage - street connections. Septic tanks and effluent disposal system

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

EN3304 NOISE POLLUTION AND CONTROL L T P C
3 0 0 3

UNIT I NOISE POLLUTION AND ITS MEASUREMENT

UNIT II CHARACTERIZATION OF NOISE AND ITS EFFECTS
Characterization of Noise from Construction, Mining, Transportation and Industrial Activities, Airport Noise – General Control Measures – Effects of noise pollution – auditory effects, non-auditory effects.

UNIT III CONTROL OF NOISE
Noise Menace – Noise and the Foetus – Prevention and Control of Noise Pollution – Control of noise at source, control of transmission, protection of exposed person - Control of other types of Noise Sound Absorbent – Noise Pollution Analyzer – Auditorium Designing – Anti Noise Device.
UNIT IV THE PHYSICAL CONTROL OF NOISE 9

UNIT V NOISE AND THE AUTHORITIES 9

REFERENCES
2. Mukergee, Environmental Pollution and Health Hazards, causes and effects (1986).

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES

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**EN3306**  
OCCUPATIONAL HAZARDS AND INDUSTRIAL HYGIENE  
L T P C  
3 0 0 3

**UNIT I**  
INDUSTRIAL ATMOSPHERIC CONTAMINANTS AND HEALTH HAZARDS  
9


**UNIT II**  
INDUSTRIAL TOXICOLOGY AND INDUSTRIAL HYGIENE SURVEY  
9


**UNIT III**  
INDUSTRIAL VENTILATION  
9

Industrial Ventilation - general principles of air flow - general dilution ventilation - comfort ventilation. Local exhaust ventilation - principles of hood and duct design - duct system design - fans.

**UNIT IV**  
CONTROL MEASURES  
9

Air cleaning Devices - relative efficiencies - Testing of local exhaust ventilation systems..25 Industrial Noise Control - general engineering principles of control - standards.

**UNIT V**  
INDUSTRIAL ILLUMINATION AND INDUSTRIAL PLANT SANITATION  
9

Industrial illumination - glare – types & levels of illumination. Industrial plant sanitation - housekeeping - worker facilities.

**REFERENCES**
1. Patty, “Industrial Hygiene and Toxicology”, Wiley Inter science, 1979.
INTRODUCTION TO ATMOSPHERIC MONITORING:

1. Particulate Sampling – Dust Fall, Pollution Suspended Particulates and Total Particulate Matters using High Volume Sampler / Respirable Dust Sampler.
2. Experiment on Respirable Dust – Estimating RPM.
4. Stack Sampling Techniques and Demonstration of Stack Monitoring.
5. Exercises on Ambient Gas Monitoring using GASTEC Device.
6. Demonstration / Exercises on Air Pollution Control Devices – Bag Filter, Scrubber, Cyclone and ESP.
9. Exercises on Luxmeter (Light Intensity measuring Instrument)
10. Demonstration on Wind Monitoring and Analysis of Data for Windrose Diagrams.
11. Demonstration of Rain Gauges.

Note: Experiments to be conducted for 8-hr and 24-hr cycles.

TOTAL: 45 PERIODS

REFERENCES:
3. Relevant IS Codes.

Globalisation has brought in numerous opportunities for the teeming millions, with more focus on the students’ overall capability apart from academic competence. Many students, particularly those from non-English medium schools, find that they are not preferred due to their inadequacy of communication skills and soft skills, despite possessing sound knowledge in their subject area along with technical capability. Keeping in view their pre-employment needs and career requirements, this course on Communication Skills Laboratory will prepare students to adapt themselves with ease to the industry environment, thus rendering them as prospective assets to industries. The
course will equip the students with the necessary communication skills that would go a long way in helping them in their profession.

OBJECTIVES:
- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them develop their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their job.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

<table>
<thead>
<tr>
<th>I. PC based session</th>
<th>(Weightage 40%)</th>
<th>24 periods</th>
</tr>
</thead>
</table>

A. ENGLISH LANGUAGE LAB (18 Periods)

1. LISTENING COMPREHENSION: (6)
   - Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.

2. READING COMPREHENSION: (6)
   - Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

3. SPEAKING: (6)
   - Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

B. DISCUSSION OF AUDIO-VISUAL MATERIALS (6 PERIODS)
   (Samples are available to learn and practice)

1. RESUME / REPORT PREPARATION / LETTER WRITING (1)
   - Structuring the resume / report - Letter writing / Email Communication - Samples.

2. PRESENTATION SKILLS: (1)
   - Elements of effective presentation – Structure of presentation – Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

3. SOFT SKILLS: (2)
   - Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

4. GROUP DISCUSSION: (1)
   - Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD -Video samples

5. INTERVIEW SKILLS: (1)
Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews – Video samples.

<table>
<thead>
<tr>
<th>II. Practice Session</th>
<th>(Weightage – 60%)</th>
<th>24 periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Resume / Report Preparation / Letter writing</strong>: Students prepare their own resume and report.</td>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td>2. <strong>Presentation Skills</strong>: Students make presentations on given topics.</td>
<td>(8)</td>
<td></td>
</tr>
<tr>
<td>3. <strong>Group Discussion</strong>: Students participate in group discussions.</td>
<td>(6)</td>
<td></td>
</tr>
<tr>
<td>4. <strong>Interview Skills</strong>: Students participate in Mock Interviews</td>
<td>(8)</td>
<td></td>
</tr>
</tbody>
</table>

**TEXT BOOKS**

**REFERENCES**

**LAB REQUIREMENT**
1. Teacher console and systems for students.
2. English Language Lab Software
3. Career Lab Software
## Requirement for a batch of 60 students

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Description of Equipment</th>
<th>Quantity required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o PIV system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o 1 GB RAM / 40 GB HDD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o OS: Win 2000 server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Audio card with headphones (with mike)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o JRE 1.3</td>
<td>1 No.</td>
</tr>
<tr>
<td>2.</td>
<td>Client Systems</td>
<td></td>
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<tr>
<td></td>
<td>o PIII or above</td>
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<tr>
<td></td>
<td>o 256 or 512 MB RAM / 40 GB HDD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o OS: Win 2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Audio card with headphones (with mike)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o JRE 1.3</td>
<td>60 No.</td>
</tr>
<tr>
<td>3.</td>
<td>Handicam Video Camera (with video lights and mic input)</td>
<td>1 No.</td>
</tr>
<tr>
<td>4.</td>
<td>Television - 29”</td>
<td>1 No.</td>
</tr>
<tr>
<td>5.</td>
<td>Collar mike</td>
<td>1 No.</td>
</tr>
<tr>
<td>6.</td>
<td>Cordless mikes</td>
<td>1 No.</td>
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<tr>
<td>7.</td>
<td>Audio Mixer</td>
<td>1 No.</td>
</tr>
<tr>
<td>8.</td>
<td>DVD Recorder / Player</td>
<td>1 No.</td>
</tr>
</tbody>
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**EN3309 ENVIRONMENTAL ENGINEERING LABORATORY – III**  
**L T P C**  
**0 0 3 2**  
**AIM**  
To provide an exposure of basic engineering practices to the student.

**PLUMBING WORKS:**

1. Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, and elbows in household fittings.
2. Study of pipe connections requirements for pumps – Connections.
3. Preparation of plumbing line sketches for water supply and sewage works.

5. Demonstration of plumbing requirements of high-rise buildings.

PIPING:
1. Practical of making plain surface with file over metal surface
2. Practice of pipe cutting and remaking
3. Practice of thread cutting of pipe, socket, nipple & Tee
4. Practice of bending G.I. pipe
5. Practice rectangular pipe services connection with different fittings in different way and disconnect the same.

HOUSE WIRING:
1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring
3. Stair-case wiring
5. Measurement of energy using single phase energy meter.

TOTAL: 45 PERIODS

GE2022 TOTAL QUALITY MANAGEMENT

UNIT I INTRODUCTION

UNIT II TQM PRINCIPLES
Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I

UNIT IV TQM TOOLS & TECHNIQUES II
UNIT V  QUALITY SYSTEMS


TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES: