



**ACCREDITED BY NBA & NAAC WITH A-GRADE**  
**NARSIMHA REDDY ENGINEERING COLLEGE**  
 PERMANENTLY AFFILIATED TO JNTUH, HYDERABAD - APPROVED BY AICTE, NEW DELHI  
 AN ISO 9001 : 2008 CERTIFIED INSTITUTE



### UGC AUTONOMOUS

### B.Tech I Year Syllabus (w.e.f AY 2021-2022)

### COMMON FOR ECE, CSE-CS, CS-DS & CSE-AI&ML

#### I YEAR I SEMISTER

S.NO	COURSE CODE	COURSE TITLE	L	T	P	CREDITS
1	MA1101BS	LINEAR ALGEBRA & CALCULUS	3	1	0	4
2	CH1102BS	CHEMISTRY	3	1	0	4
3	ME1103ES	ENGINEERING GRAPHICS	1	0	4	3
4	EE1104ES	BASIC ELECTRICAL ENGINEERING	3	0	0	3
5	CH1105BS	CHEMISTRY LAB	0	0	3	1.5
6	ME1106ES	ENGINEERING WORKSHOP	1	0	3	2.5
7	EE1107ES	BASIC ELECTRICAL ENGINEERING LAB	0	0	2	1
		INDUCTION PROGRAMME				
TOTAL CREDITS			11	2	12	19

#### I YEAR II SEMISTER

S.N O	COURSE CODE	COURSE TITLE	L	T	P	CREDITS
1	MA1201BS	ADVANCED CALCULUS	3	1	0	4
2	AP1202BS	APPLIED PHYSICS	3	1	0	4
3	CS1203ES	PROGRAMMING FOR PROBLEM SOLVING	3	1	0	4
4	EN1204HS	ENGLISH	2	0	0	2
5	AP1205BS	APPLIED PHYSICS LAB	0	0	3	1.5
6	CS1206ES	PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	1.5
7	EN1207HS	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	0	0	2	1
8	MC1001ES*	ENVIRONMENTAL SCIENCE	3	0	0	0
TOTAL CREDITS			14	3	8	18

## LINEAR ALGEBRA & CALCULUS

### B.Tech. I Year I Semester

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
MA1101BS	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

#### Course Objectives: To learn

1. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
2. Method of finding Eigen values, eigenvectors and to reduce the quadratic form to canonical form.
3. Concept of expansion of Fourier series.
4. Geometrical approach to mean value theorems and evaluation of improper integrals using Beta and Gamma functions.
5. Partial differentiation and finding maxima and minima of function of two or more variables.

#### Course Outcomes: After learning the contents of this paper the student must be able to

1. Solve the system of Linear equations in various engineering problems
2. Evaluate the Eigen values and Eigen vectors
3. Expand Fourier series of given functions in arbitrary intervals
4. Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions
5. Find the extreme values of functions of two variables with/ without constraints.

#### UNIT-1: Matrices

Matrices: Introduction. Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration method, LU Decomposition Method.

#### UNIT-2: Eigen values and Eigen vectors

Vectors Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties. Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding the inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of Quadratic forms; Reduction of Quadratic form to Canonical form by Orthogonal Transformation.

#### UNIT-3: Fourier series

Definition of periodic function, Fourier expansion of periodic function in  $(0, 2\pi)$  and  $(-\pi, \pi)$ .  
Determination of Fourier coefficients – Fourier series of even and odd functions; Half – Range Fourier Sine and Cosine expansions.

#### **UNIT-IV: Calculus**

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value theorem. Definition of Improper Integral : Beta and Gamma functions and their applications.

#### **UNIT-V: Multivariable Calculus (Partial Differentiation and applications)**

Definition of limit and continuity. Partial Differentiation ; Euler's Theorem ; Total derivative ; Jacobian ; Functional dependence & independence , Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

#### **TEXTBOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

#### **REFERENCES:**

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010

## CHEMISTRY

### B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CH1102BS	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

#### Course objectives:

1. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
2. To develop specialized knowledge in the analysis of water and waste water which are essential for the engineers and in industry.
3. Learn about the fundamentals of electrode reactions and electrochemical cells
4. To provide an understanding of the corrosion principles and engineering methods used to minimize and prevent corrosion.
5. To familiarize students about the characteristics and applications of different polymers and engineering materials in every day life.
6. To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

#### Course outcomes:

1. The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. Apply knowledge and understanding of water treatment process to real world problems.
3. Interpret the knowledge of electrochemical phenomenon involved in developing batteries and understanding fuel cells fundamentals.
4. Ability to determine appropriate method of protection against corrosion for a metal based on its applications in different fields.
5. Classify and characterize different polymers engineering materials and apply its knowledge to select suitable materials for specific applications.
6. The required skills to get clear concepts on basic spectroscopy and applications to medical and other fields.

#### UNIT - I:

##### Molecular structure and Theories of Bonding:

Atomic and molecular orbitals. Linear combination of atomic orbitals (LCAO), molecular orbitals of diatomic orbitals, molecular orbital energy level diagrams for N<sub>2</sub>, O<sub>2</sub> and F<sub>2</sub> molecules. Crystal field theory (CFT): Salient features of CFT- Crystal Field Splitting of transition metal ion d-orbitals in Tetrahedral, Octahedral and Square planar geometries. Band structure of solids and effect of doping on conductance.

## UNIT-II

**Water and its treatment:** Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent -expression and units of hardness. Numerical problems. Disadvantages of hard water.

Boiler troubles: Scales and Sludges, caustic embrittlement, boiler corrosion, Softening of water by internal treatment of Boiler feed water and ion- exchange processes. Desalination of water – Reverse osmosis. Sewage water treatment. Potable water treatment - Disinfection of potable water by chlorination and Ozonization.

## UNIT-III

### **Electrochemistry, Batteries and Corrosion:**

Electrochemistry: Electrochemical cells- Electrode, electrode potential, standard electrode potential, types of electrodes- Calomel and glass electrodes. Nernst equation, electrochemical series and its applications. Batteries: Cell and battery - Primary (Lithium cell) and secondary batteries (Lead – acid storage battery, Lithium ion battery, advantages and applications of solid state battery) Fuel cells: Hydrogen-oxygen, solid polymer electrolytic fuel cell, Bio chemical fuel cells----- Advantages and Applications. Corrosion and its control –Concept of corrosion, Types of corrosion, mechanism of Chemical & Electro chemical corrosion. Types of electro chemical corrosion (Galvanic corrosion, Pitting, Water line corrosion, stress corrosion). Factors affecting corrosion. Corrosion control methods -Principle of cathodic protection- Sacrificial Anodic Protection (SAP), Impressed Current Cathodic Protection (ICCP) . Protective coatings: Metallic coatings- Hot dipping, metal cladding, cementation, electroplating of copper, electro less plating of nickel, **paints**.

## UNIT-IV

### **Engineering materials:**

**Ceramics:** Properties & types of ceramics. Engineering applications of ceramics. **Polymers:** Definition, classification, properties of polymers. Plastics-Compounding of plastics, Engineering applications of plastics (PVC, Teflon, Bakelite), Fibres - Applications of Nylon 6. FRP- Types, advantages and applications. Natural rubber and its vulcanization. Elastomers- Applications. Conducting polymers and its applications-Mechanism of conduction and doping in poly acetylene. Applications of bio degradable polymers. **Composites:** Classification, Constituents, advantages, applications. **Lubricants:** Classification, properties and mechanism of lubrication.

## UNIT-V

### **Spectroscopic techniques and applications:**

Principles of Spectroscopy, Selection rules and applications of electronic spectroscopy. Vibrational and rotational spectroscopy. Basic concepts of Nuclear Magnetic resonance spectroscopy, Chemical shift. Introduction to Magnetic Resonance Imaging.

### **Suggested Text Books:**

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
6. R. V. E. Gadag & A. Nityananda Shetty, Engineering Chemistry, I K International Publishing House Private Limited, New Delhi, 2015 Edition

## ENGINEERING GRAPHICS

### B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
ME1103ES	Engineering Sciences	L	T	P	3	CIA	SEE	TOTAL
		1	0	4		30	70	100
Contact Classes: 16	Tutorial Classes: Nil	Practical Classes: 64				Total Classes:80		

#### Course objectives:

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

#### Course Outcomes: At the end of the course, the student will be able to:

1. Preparing working drawings to communicate the ideas and information.
2. Read, understand and interpret engineering drawings.

#### UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

#### UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes.

#### UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids –Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

#### UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

#### UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical

Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions

**Introduction to CAD:** (For Internal Evaluation Weightage only):

Introduction to CAD Software Package Commands. - Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

**TEXT BOOKS:**

Engineering Drawing N.D. Bhatt / Charotar

Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

**REFERENCE BOOKS:**

1. Engineering Drawing / Basant Agrawal and McGraw/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

## BASIC ELECTRICAL ENGINEERING

### B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
EE1104ES	Engineering Sciences	L	T	P	1	CIA	SEE	TOTAL
		0	0	2		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

#### Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To impart the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.●

#### Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations●

#### UNIT-I:

D.C. Circuits Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems and maximum power transfer theorem. Time-domain analysis of first-order RL and RC circuits.

#### UNIT-II:

A.C. Circuits Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

#### UNIT-III:

Transformers Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

#### UNIT-IV:

Electrical Machines Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Construction and working principle of Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.



**UNIT-V:**

Electrical Installations Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Power factor measurement using 2 wattmeter method, Elementary calculations for energy consumption,

**TEXT BOOKS/ REFERENCE BOOKS:**

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 198

## CHEMISTRY LAB

### B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CH1105BS	Basic Sciences	L	T	P	1.5	CIA	SEE	TOTAL
		0	0	3		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

**Course Objectives:** The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

**Course Outcomes:** The experiments will make the student gain skills on:

1. Determination of parameters like hardness and chloride content in water.
2. Estimation of rate constant of a reaction from concentration – time relationships.
3. Determination of physical properties like adsorption and viscosity.
4. Calculation of R<sub>f</sub> values of some organic molecules by TLC technique.

### List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe<sup>2+</sup> by Potentiometry using KMnO<sub>4</sub>
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of R<sub>f</sub> values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n- butanol and water.
14. Determination of surface tension of a given liquid using stalagmometer.

### References

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

## ENGINEERING WORKSHOP

### B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
ME1106ES	Engineering Sciences	L	T	P	2.5	CIA	SEE	TOTAL
		1	0	3		30	70	100
Contact Classes: 16	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:64		

#### Course Objectives:

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

**Course Outcomes:** At the end of the course, the student will be able to:

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

#### 1. TRADES FOR EXERCISES:

**At least two exercises from each trade:**

1. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
2. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
3. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
4. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
5. Welding Practice – (Arc Welding & Gas Welding)
6. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
7. Black Smithy – (Round to Square, Fan Hook and S-Hook)

#### 2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in

construction and WoodWorking

**TEXT BOOKS:**

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

**REFERENCE BOOKS:**

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

## EE1107ES: BASIC ELECTRICAL ENGINEERING LAB

### B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
EN1107HS	Humanities & Sciences	L	T	P	1	CIA	SEE	TOTAL
		0	0	2		30	40	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

#### Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems
2. To know the response of electrical circuits for different excitations
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines

#### Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters
4. Understand the basic characteristics of transformers and electrical machines.

#### List of experiments/demonstrations:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL , RC and RLC circuits using DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a SinglePhase Transformer
7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
8. Three Phase Transformer: Verification of Relationship between Voltages and Currents (StarDelta, Delta-Delta, Delta-star, Star-Star)
9. Measurement of Active and Reactive Power in a balanced Three-phase circuit
10. Open circuit Characteristics of a Separately/Self Excited DC Shunt/Compound Generator
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
13. Performance Characteristics of a Three-phase Induction Motor

14. Torque-Speed Characteristics of a Three-phase Induction Motor

15. No-Load Characteristics of a Three-phase Alternator

**MA1201BS: ADVANCED CALCULUS****B.Tech. I Year II Semester:**

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
MA1201BS	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
<b>Contact Classes: 48</b>	<b>Tutorial Classes: 16</b>	<b>Practical Classes: Nil</b>				<b>Total Classes:64</b>		

**Course Objectives:** To learn

1. Methods of solving the differential equations of first and higher order.
2. Evaluation of multiple integrals and their applications
3. The physical quantities involved in engineering field related to vector valued functions
4. The basic properties of vector valued functions and their applications to line, surface and volume integrals

**Course Outcomes:** After learning the contents of this paper the student must be able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
4. Evaluate the line, surface and volume integrals and converting them from one to another

**UNIT-I: First Order Ordinary Differential Equations**

Exact, linear and Bernoulli's equations ; Applications : Newton's law of cooling , Law of natural growth and decay ; Equations not of first degree : equations solvable for p, Applications: LR circuit problems.

**UNIT-II: Ordinary Differential Equations of Higher Order**

Second order linear differential equations with constant coefficients : Non-Homogeneous terms of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in x,  $e^{ax}V(x)$  and  $xV(x)$ ; method of variation of parameters, Applications: LCR circuit problems.

**UNIT-III: Multivariable Calculus (Integration)**

Evaluation of Double Integrals (Cartesian coordinates) ; change of order of Integration (only Cartesian form) ; Evaluation of triple Integrals : Change of variables (Cartesian to polar) for double and (Cartesian to Spherical And Cylindrical polar coordinates) for triple integrals.Applications: Areas (double integrals) and volumes (by double integrals and triple integrals).

**UNIT-IV: Vector Differentiation**

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vectors Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

## **UNIT-V: Vector Integration**

Line, Surface and Volume Integrals. Theorems of Greens, Gauss and Stokes (without proofs) and their applications.

### **TEXT BOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

### **REFERENCES:**

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984



**AP1202BS: APPLIED PHYSICS****B.Tech. I Year II Semester.**

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
AP1202BS	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
<b>Contact Classes: 48</b>	<b>Tutorial Classes: 16</b>	<b>Practical Classes: Nil</b>				<b>Total Classes:64</b>		

**Course Objectives:**

1. Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and Electromagnetic theory and a broad base of knowledge in physics.
3. The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
4. To study applications in engineering like memory devices, transformer core and superconductors.

**Course Outcomes: Upon graduation:**

1. **Demonstrate** the importance of behavior of a particle quantum mechanically
2. **Analyze** the role of semiconductors in science and engineering Applications.
3. **Analyze & compare** the device structures in Semiconductor electronics .
4. **Analyse** and **explain** principle, working of various laser systems and **examine** light propagation through optical fibers.
5. **Examine** various magnetic dielectric properties and **Apply** them in engineering applications

**UNIT-I**

**Principles of Quantum Mechanics:** Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, G-P Thomson experiment, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

**UNIT-II**

**Semiconductor Physics:** Origin of Energy Band Formation in Solids, Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier transport: diffusion and drift, Hall effect, Formation of PN junction, Open circuit PN junction, Energy diagram of PN diode, I-V Characteristics of PN junction diode, Zener diode –breakdown mechanism and characteristics

**UNIT-III**

**Physics of Semiconductor Devices:** Generation & recombination mechanisms in semiconductors, LED and semiconductor lasers: Device structure, Materials, Characteristics and figures of merit, Photo diode(PIN diode) & Solar cell - their structure, Materials, working principle and Characteristics.

**UNIT-IV**

**Lasers:** Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, He-Ne laser, Applications of laser-Scientific & Medical applications.

**Fibre Optics:** Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Absorption & Bending Losses associated with optical fibres, Applications of optical fibres-Sensor & Medical Field.

## **UNIT-V**

**Dielectric Properties:** Polarisation, Permittivity and Dielectric constant, Types of Polarisation, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics.

**Magnetic Properties:** Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Hard & Soft Magnetic materials, Applications of magnetic materials.

## **TEXT BOOKS:**

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

## **REFERENCES:**

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL

## CS1203ES: PROGRAMMING FOR PROBLEM SOLVING

**B.Tech. I Year II Semester.**

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
CS1203ES	Engineering Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil			Total Classes:64			

### Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.

### Course Outcomes: The student will learn

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems.

### UNIT - I: Introduction to Programming

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments

Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr. Command line arguments

### UNIT - II: Arrays, Strings, Structures and Pointers:

Arrays: one- and two-dimensional arrays, creating, accessing and manipulating elements of arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

### **UNIT - III: Preprocessor and File handling in C:**

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef  
Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

### **UNIT - IV: Function and Dynamic Memory Allocation:**

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

### **UNIT - V: Introduction to Algorithms:**

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc.

Basic searching in an array of elements (linear and binary search techniques),

Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

### **TEXT BOOKS:**

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3<sup>rd</sup> Edition)

### **REFERENCE BOOKS:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
2. Hall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16<sup>th</sup> Impression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
5. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4<sup>th</sup> Edition

## ENGLISH

### B.Tech. I Year II Semester.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
EN1204HS	Humanities & Sciences	L	T	P	2	CIA	SEE	TOTAL
		2	0	0		30	70	100
Contact Classes: 32	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:32		

**INTRODUCTION** In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

**Learning Objectives:** The course will help to a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. b. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. c. Develop study skills and communication skills in formal and informal situations.

**Course Outcomes:** Students should be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

### SYLLABUS

**UNIT –I ‘The Raman Effect’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press. Vocabulary Building:** The Concept of Word Formation --The Use of Prefixes and Suffixes.

**Grammar:** Identifying Common Errors in Writing with Reference to Articles and Prepositions.

**Reading:** Reading and Its Importance- Techniques for Effective Reading.

**Basic Writing Skills:** Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

**UNIT –II ‘Ancient Architecture in India’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary:** Synonyms and Antonyms.

**Grammar:** Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension **Writing:** Format of a Formal Letter-

**Writing Formal Letters** E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.

**UNIT –III ‘Blue Jeans’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary:** Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

**Grammar:** Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses. **Reading:** Sub-skills of Reading- Skimming and Scanning

**Writing:** Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying-** Providing Examples or Evidence

**UNIT –IV ‘ KING LEAR ‘ a tragedy story by William Shakespeare, play synopsis of Act 1 & 2 published by Bloom, Harold. “King Lear.” Shakespeare : The Invention of the Human. New York: Riverhead, 1998.**

**Vocabulary:** Standard Abbreviations in English Grammar: Redundancies and Clichés in Oral and Written Communication.

**Reading: Comprehension-** Intensive Reading and Extensive Reading

**Writing: Writing Practices--**Writing Introduction and Conclusion - Essay Writing-Précis Writing.

**UNIT –V ‘How a Chinese Billionaire Built Her Fortune’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.**

**Vocabulary:** Technical Vocabulary and their usage

**Grammar:** Common Errors in English

**Reading:** Reading Comprehension-Exercises for Practice

**Writing: Technical Reports-** Introduction – Characteristics of a Report – Categories of Reports  
Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

**Textbook:**

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.
2. Nahum Tate’s 1681 Adaption of King Lear

**References:**

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.

3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

**APPLIED PHYSICS LAB****B.Tech. I Year II Semester:**

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
AP1205BS	Basic Sciences	L	T	P	1.5	CIA	SEE	TOTAL
		0	0	3		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

**Course Outcomes:**

1. Design; create skills to impart practical knowledge in real time solution.
2. Explain, demonstrate principle, concept, working and application of new technology and compare results with theoretical calculations
3. Construct and develop, organize new instruments with practical knowledge.
4. Interpret, and summarize of new concept in the solution of practical oriented problems and to extend the knowledge about the solution to theoretical problems.
5. Understand measurement technology, usage of new instruments

**List of Experiments:**

1. Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.
2. Solar Cell: To study the V-I Characteristics of solar cell.
3. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
4. Stewart – Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.
5. Hall Effect: To determine Hall co-efficient of a given semiconductor.
6. Photoelectric effect: To determine work function of a given material.
7. LASER: To study the characteristics of LASER sources.
8. Optical fiber: To determine the bending losses of Optical fibres.
9. LCR Circuit: To determine the Quality factor of LCR Circuit.
10. R-C Circuit: To determine the time constant of R-C circuit.

**Note: Any 8 experiments are to be performed**



## CS1206ES: PROGRAMMING FOR PROBLEM SOLVING LAB

**B.Tech. I Year II Sem.**

**L T P C**

**0 0 3 1.5**

*[Note: The programs may be executed using any available Open Source/ Freely available IDE  
Some of the Tools available are:*

CodeLite: <https://codelite.org/>

Code::Blocks:

<http://www.codeblocks.org/>

DevCpp :

<http://www.bloodshed.net/devcpp.html>

Eclipse: <http://www.eclipse.org>

*This list is not exhaustive and is NOT in any order of preference]*

**Course Objectives:** The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

**Course Outcomes:** The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

**Practice sessions:**

- a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment , bitwise and/or/not , etc.). Read required operand values from standard input.
- b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

**Simple numeric problems:**

- a. Write a program to find the max and min from the three numbers.
- b. Write the program for the simple, compound interest.
- c. Write program that declares Class awarded for a given percentage of marks, where mark <40% = Failed, 40% to <60% = Second class, 60% to <70% = First class, >= 70% = Distinction. Read percentage from standard input.
- d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
  - e.  $5 \times 1 = 5$
  - f.  $5 \times 2 = 10$
  - g.  $5 \times 3 = 15$
- h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

### Expression Evaluation:

- a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula  $s = ut + \frac{1}{2}at^2$  where  $u$  and  $a$  are the initial velocity in m/sec (= 0) and acceleration in  $\text{m/sec}^2$  (=  $9.8 \text{ m/s}^2$ )).
- b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)
- c. Write a program that finds if a given number is a prime number
- d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
- e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first  $n$  terms of the sequence.
- f. Write a C program to generate all the prime numbers between 1 and  $n$ , where  $n$  is a value supplied by the user.
- g. Write a C program to find the roots of a Quadratic equation.
- h. Write a C program to calculate the following, where  $x$  is a fractional value.
  - i.  $1 - \frac{x}{2} + \frac{x^2}{4} - \frac{x^3}{6}$
  - j. Write a C program to read in two numbers,  $x$  and  $n$ , and then compute the sum of this geometric progression:  $1 + x + x^2 + x^3 + \dots + x^n$ . For example: if  $n$  is 3 and  $x$  is 5, then the program computes  $1 + 5 + 25 + 125$ .

### Arrays and Pointers and Functions:

- a. Write a C program to find the minimum, maximum and average in an array of integers.
- b. Write a functions to compute mean, variance, Standard Deviation, sorting of  $n$  elements in single dimension array.
- c. Write a C program that uses functions to perform the following:
- d. Addition of Two Matrices
- e. ii. Multiplication of Two Matrices
- f. iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.

- g. Write C programs that use both recursive and non-recursive functions
- h. To find the factorial of a given integer.
- i. ii. To find the GCD (greatest common divisor) of two given integers.
- j. iii. To find  $x^n$
- k. Write a program for reading elements using pointer into array and display the values using array.
- l. Write a program for display values reverse order from array using pointer.
- m. Write a program through pointer variable to sum of n elements from array.

#### **Files:**

- a. Write a C program to display the contents of a file to standard output device.
- b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
- c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
- d. Write a C program that does the following:

It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)  
The program should then read all 10 values and print them back.

- e. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

#### **Strings:**

- a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
- b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
- c. Write a C program that uses functions to perform the following operations:
- d. To insert a sub-string in to a given main string from a given position.
- e. ii. To delete n Characters from a given position in a given string.
- f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
- g. Write a C program that displays the position of a character ch in the string S or -1 if S doesn't contain ch.
- h. Write a C program to count the lines, words and characters in a given text.

#### **Miscellaneous:**

- a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
- b. Write a C program to construct a pyramid of numbers as follows:

1	*	1	1	*
1 2	* *	2 3	2 2	* *
1 2 3	* * *	4 5 6	3 3 3	* * *
			4 4 4 4	* *
				*

### Sorting and Searching:

- Write a C program that uses non recursive function to search for a Key value in agiven
- list of integers using linear search method.
- Write a C program that uses non recursive function to search for a Key value in agiven
- sorted list of integers using binary search method.
- Write a C program that implements the Bubble sort method to sort a given list of
- integers in ascending order.
- Write a C program that sorts the given array of integers using selection sort in descending order
- Write a C program that sorts the given array of integers using insertion sort in ascending order
- Write a C program that sorts a given array of names

### Suggested Reference Books for solving the problems:

- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3<sup>rd</sup> Edition)
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
- Hall of India
- R.G. Dromey, How to solve it by Computer, Pearson (16<sup>th</sup> Impression)
- Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
- Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4<sup>th</sup> Edition

## EN1207HS: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

### B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
EN1207HS	Humanities & Sciences	L	T	P	1	CIA	SEE	TOTAL
		0	0	2		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

#### Course Objectives:

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews

**Learning Outcomes:** Students will be able to attain

1. Better understanding of nuances of English language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhances their employability skills

#### Syllabus

**English Language and Communication Skills Lab (ELCS) shall have two parts:**

**a. Computer Assisted Language Learning (CALL) Lab**

**b. Interactive Communication Skills (ICS) Lab**

#### Listening Skills

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

## **Speaking Skills**

### **Objectives**

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
  - Oral practice: Just A Minute (JAM) Sessions
  - Describing objects/situations/people
  - Role play – Individual/Group activities

**The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)**

### **Exercise – I**

**CALL Lab:** *Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. *Practice:* Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

**ICS Lab:** *Understand:* Communication at Work Place- Spoken vs. Written language. *Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

### **Exercise – II**

**CALL Lab:** *Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

**ICS Lab:** *Understand:* Features of Good Conversation – Non-verbal Communication. *Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

### **Exercise - III**

**CALL Lab:** *Understand:* Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

*Practice:* Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

**ICS Lab:** *Understand:* How to make Formal Presentations. *Practice:* Formal Presentations.

### **Exercise – IV**

**CALL Lab:** *Understand:* Listening for General Details. *Practice:* Listening Comprehension Tests.

**ICS Lab:** *Understand:* Public Speaking – Exposure to Structured Talks. *Practice:* Making a Short Speech – Extempore.

### **Exercise – V**

**CALL Lab:** *Understand:* Listening for Specific Details. *Practice:* Listening Comprehension Tests.

**ICS Lab:** *Understand:* Interview Skills. *Practice:* Mock Interviews.

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**Minimum Requirement of infrastructural facilities for ELCS Lab:**

**1. Computer Assisted Language Learning (CALL) Lab:**

**The Computer Assisted Language Learning Lab** has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self-study by students.

**System Requirement (Hardware component):** *Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*

- i) Computers with Suitable Configuration
- ii) High Fidelity Headphones

**2. Interactive Communication Skills (ICS) Lab:**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

**MC1001ES\*: ENVIRONMENTAL SCIENCE  
(MANDATORY NON CREDIT COURSE)**

**B.Tech. I Year II Semester:**

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
MC1001ES*	Humanities & Sciences	L	T	P	1	CIA	SEE	TOTAL
		0	0	2		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

**Course Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

**Course Outcomes:**

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

**UNIT-I**

**Ecosystems:** Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

**UNIT-II**

**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**UNIT-III**

**Biodiversity And Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

**UNIT-IV**

**Environmental Pollution and Control Technologies: Environmental Pollution:**

Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.



Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

#### **UNIT-V**

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### **TEXT BOOKS:**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

#### **REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.