



**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

(Sponsored by TKR Educational Society, Approved by AICTE, Affiliated by JNTUH,
Accredited by NBA & NAAC with 'A' Grade)



**B.TECH – CIVIL ENGINEERING
Course Structure R-22**

SEMESTER I

S.No.	Course Classification	Course Code	Name of the Subject	L	T	P	C	I	E	Total
1.	BS	D1BSM1	Linear Algebra and Ordinary Differential Equations	3	1	0	4.0	40	60	100
2.	BS	D1BSEP1	Engineering Physics	3	1	0	4.0	40	60	100
3.	ES	D1ESBEE1	Basic Electrical and Electronics Engineering	3	0	0	3.0	40	60	100
4.	ES	D1ESEM1	Engineering Mechanics	3	0	0	3.0	40	60	100
5.	BS	D1BSEP2	Engineering Physics Lab	0	0	3	1.5	40	60	100
6.	ES	D1ESDW	Computer Aided Drawing Lab	0	1	2	2.0	40	60	100
7.	ES	D1ESBEE2	Basic Electrical & Electronics Engineering Lab	0	0	2	1.0	40	60	100
8.	ES	D1ESBW1	Basic Workshop	0	0	3	1.5	40	60	100
Total				12	3	10	20	320	480	800

SEMESTER II

S.No.	Course Classification	Course Code	Name of the Subject	L	T	P	C	I	E	Total
1.	BS	D2BSM2	Numerical Methods and Applications	3	1	0	4.0	40	60	100
2.	ES	D2ESCP1	C Programming for Problem Solving	3	0	0	3.0	40	60	100
3.	HS	D2HSE1	English for Skill Enhancement	2	0	0	2.0	40	60	100
4.	BS	D2BSAC1	Applied Chemistry	3	1	0	4.0	40	60	100
5.	ES	D2ESEG1	Engineering Graphics	1	0	4	3.0	40	60	100
6.	BS	D2BSAC2	Applied Chemistry Lab	0	0	3	1.5	40	60	100
7.	ES	D2ESCP2	Basic C Programming for Problem Solving Lab	0	0	3	1.5	40	60	100
8.	HS	D2HSE2	English Language and Communication Skills Lab	0	0	2	1.0	40	60	100
Total				12	2	12	20	320	480	800



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CIVIL ENGINEERING

B.Tech I Year I Semester

**L/T/P/C
3/1/0/4**

LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS (D1BSM1)

Pre-requisites: Mathematical Knowledge at pre-university level

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. Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form.
3. Methods of solving the differential equations of first order.
4. Find general solution to linear, homogeneous and non homogeneous ODEs with constant coefficients.
5. Evaluation of double integrals.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. **CO1:** Discuss the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
2. **CO2:** Reduce the quadratic form to canonical form using orthogonal transformation.
3. **CO3:** Identify whether the given DE of first order is exact or not.
4. **CO4:** Can find applications of first order ODE.
5. **CO5:** Solve higher differential equation and apply the concept of differential equation to real world problems.
6. **CO6:** Evaluating double integrals and applying them to compute the areas of regions.

UNIT I

Matrices & System of Equations:

Types of matrices - rank of a matrix by Echelon form and normal form- inverse of nonsingular matrices by Gauss-Jordan method - System of linear equations- solving system of homogeneous and non homogeneous equations- Gauss elimination method.

UNIT II**Eigen Values and Eigen Vectors:**

Eigen values and Eigen vectors and their properties - Cayley-Hamilton theorem(without proof) finding inverse and powers of a matrix by Cayley-Hamilton theorem- diagonalization of a Matrix - linear transformation and orthogonal transformation - quadratic forms and nature of the quadratic forms- reduction of quadratic form to Canonical forms by orthogonal transformation.

UNIT III**Ordinary Differential Equations of First Order, First Degree and its applications****Applications:**

Exact- linear and Bernoulli's equations- orthogonal trajectories - applications - Newton's law of cooling-law of natural growth and decay.

UNIT IV**Second Order Ordinary Linear Differential Equations:**

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.

UNIT V**Double Integrals and Applications:**

Evaluation of double Integrals (cartesian and polar coordinates) - change of order of integration(only cartesian form)- change of variables (cartesian to polar) for double integrals- applications of double integrals to evaluate surface areas of curves (only in Cartesian Coordinates).

Text Books:

1. B.S.Grewal- Higher Engineering Mathematics- Khanna Publishers- 40th Edition-2015.
2. Ramana B.v.- Higher Engineering Mathematics- Tata McGraw Hill New Delhi- 11th Reprint- 2010.
3. Engineering Mathematics by TKV Iyengar, B. Krishna Gandhi, S. Chand and publications

Reference Books:

1. N.P. Bali and Manish Goyal- A text book of engineering Mathematics- Laxmi Publications-Reprint-2008.
2. Erwin Kreyszig –Advanced Engineering Mathematics- 10thEdition- Wiley - 2021
3. Advanced Engineering Mathematics by S.R.K. Iyengar R.K. Jain – Narosa Publications.

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**CIVIL ENGINEERING****B.Tech I Year I Semester****L/T/P/C****3/1/-/4****ENGINEERING PHYSICS (D1BSEP1)****COURSE OBJECTIVES:**

Students will be able to

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Gain the fundamental concepts related to the dielectric and energy materials.
4. Understand the fundamental concepts of magnetic and superconducting materials
5. Understand the characteristics of lasers and optical fibers.

COURSE OUTCOMES:

At the end of the course the student will be able to:

1. Analyze the concepts of quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering applications.
3. Explore the fundamental properties of dielectric and energy materials for their applications.
4. Knowing the concepts related to magnetic and superconducting materials for different engineering applications.
5. Explore the various aspects of lasers and optical fiber and their applications in diverse fields.

UNIT I**QUANTUM MECHANICS AND BAND THEORY OF SOLIDS**

Quantum Mechanics: Wave particle duality, de Broglie's matter waves, Davisson and Germer's experiment, Heisenberg uncertainty principle, Born interpretation of the wave function, Time independent Schrodinger's wave equation, Particle in one dimensional potential box.

Band theory of solids: Electron in periodic potential- Bloch's theorem, Kronig-Penney model, E-K diagram, Effective mass of an electron, Origin of energy bands, Classification of solids.

UNIT II**SEMICONDUCTORS AND SEMICONDUCTOR DEVICES**

Semiconductors: Intrinsic and extrinsic semiconductors, carrier concentration in intrinsic and extrinsic semiconductors, Hall Effect.

Semiconductor devices :Construction, Principle of operation and characteristics of P-N Junction diode, Direct and Indirect band gap semiconductors, structure and working principle and characteristics of LED, Photo diode and solar cells.

UNIT III

DIELECTRIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions, Types of polarizations (qualitative), Ferroelectric, Piezoelectric, and Pyroelectric materials, Applications.

Energy Materials: Conductivity of liquid and solid electrolytes, Superionic conductors, materials and electrolytes for super capacitors, Rechargeable ion batteries, Solid fuel cells.

UNIT IV

MAGNETIC MATERIALS AND SUPERCONDUCTIVITY

Magnetic materials: Basic Definitions, Origin of magnetic moment in solids, Classification of magnetic materials. Domain theory of ferromagnetism, Hysteresis-soft and hard magnetic materials.

Superconductivity: Introduction, Effect of Temperature, Magnetic field and current on superconductors, Types of superconductors: Type-I, Type-II superconductors, Magnetic levitation, Applications of superconductors.

UNIT V

LASER AND FIBER OPTICS

Lasers: Laser beam characteristics, Three quantum processes, Einstein coefficients and their relations, Lasing action, Pumping methods, Ruby laser, He-Ne laser, Semiconductor laser, Applications .

Fiber Optics: Introduction to optical fibers, Advantages of optical fibers, Total internal reflection, Construction of optical fibers, Classification of optical fibers, Acceptance angle - Numerical aperture, Losses in optical fiber, Optical fiber for communication system, Applications.

TEXT BOOKS:

1. P.K PalaniSwami, Engineering Physics-II, 2ndedition Scitech publication-2012
2. P.K.Palaniswamy Engineering Physics, 4th edition Scitech publication-2014
3. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy” A Text book of Engineering Physics”-S. Chand Publications, 11th Edition 2019.
4. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
5. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, McGraw Hill, 4th Edition,2021.
6. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition, 2022.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley & Sons, 11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhyaya - Nano Materials, New Age International, 1st Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksan Dr S. Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & Francis Group, 1st Edition, 2022



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CIVIL ENGINEERING

B.Tech I Year I Semester

L/T/P/C

3/0/0/3

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (D1ESBEE1)

Course Objectives:

1. To introduce the concepts of Electrical Circuits and its components.
2. To understand Magnetic circuits, DC circuits and AC single phase and 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.
6. To introduce the concepts of Diodes & Transistors, and to impart the knowledge of various configurations, characteristics and applications.

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.
5. To identify and characterize Diodes and various types of Transistors.

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.

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, Three-phase balanced circuits, voltage and current relations in Star and Delta connections.

UNIT II

Electrical Installations: Components of LT Switch gear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

UNIT III

Electrical Machines: Working principle of Single-phase transformer, equivalent circuit, losses in transformers, efficiency, Three-phase transformer connections. Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors, Construction and working principle of Three-phase Induction motor, Torque equations and Speed control of Three-phase induction motor. Construction and working principle of Synchronous Generators.

UNIT IV

P-N Junction and Zener Diode: Principle of Operation Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Zener diode characteristics and applications.

Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters—Inductor Filters, Capacitor Filters, L-section Filters, π -section Filters.

UNIT V

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector Configurations, Comparison of CE, CB and CC configurations.

Field Effect Transistor (FET): Construction, Principle of Operation, Comparison of BJT and FET, Biasing FET.

TEXTBOOKS:

1. MS Sukija TK Nagasarkar, "Basic Electrical and Electronics Engineering", Oxford University
2. DP Kothari. IJ Nagarath, "Basic Electrical and Electronics Engineering, Mc Graw Hill Education

REFERENCEBOOKS:

1. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", PEI/PHI, 9th Ed, 2006.
2. J. Millman and C.C. Halkias, Satyabrata Jit, Millman's "Electronic Devices and Circuits", TMH, 2nd ED., 1998.
3. William Hayt and Jack E. Kemmerly, "Engineering Circuit Analysis Mc Graw Hill Company, 6th edition.
4. Raymond A. De Carlo and Pen, "Linear circuit Analysis (time Domain Phasor and Laplace transform approaches), 2nd edition -Min-Lin, Oxford University Press-2004.
5. N.C. Jagan and C. Lakshminarayana, "Network Theory", B.S. Publications.
6. Sudhakar, Shyam Mohan Palli, "Network Theory, TMH.
7. L.S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
8. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
9. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.



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CIVIL ENGINEERING

B. Tech I Semester

L/T/P/C

3/0/0/3

ENGINEERING MECHANICS (D1ESEM1)

COURSE OBJECTIVES: The objectives of this course are to

1. To explain the importance of mechanics in the context of engineering and conservation equations.
2. To introduce the techniques for analyzing the forces in the bodies.
3. To explain the significance of centroid, centre of gravity and moment of inertia.
4. To apply the different principles to study the motion of a body, and concept of relative velocity and acceleration and describe the trajectory of a particle under projectile motion.
5. To identify the basic elements of a mechanical system and write their constitutive equations.

COURSE OUTCOMES: At the end of the course, students will be able to

1. Draw free body diagrams and determine the resultant of forces and/or moments.
2. Apply laws of mechanics to determine efficiency of simple machines with consideration of friction.
3. Determine the centroid and second moment of area of sections.
4. Analyze statically determinate planar frames. Analyze the motion and calculate trajectory characteristics.
5. Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies.

UNIT I

Introduction to Engineering Mechanics

Basic concepts, System of Forces Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System.

Equilibrium of System of Forces - Free body diagrams, Equations of Equilibrium of Coplanar Systems.

UNIT II

Friction - Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack, ladder friction.

Centroid – Introduction-Centroid of Lines-Areas- centroid of I, T, L, Z-sections;

Centre of Gravity - Centre of Gravity of bodies- standard sections – Theorem of Pappus.

UNIT III**Area Moment of Inertia**

Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections.

Mass Moment of Inertia: Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia –Mass moment of inertia of standard sections.

UNIT IV**Kinetics of Rigid Bodies**

Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alemberts principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies.

UNIT V**Mechanical Vibration**

Definitions Concepts- Simple Harmonic motion- free vibrations-simple compound pendulum.

Virtual Work: Theory of Virtual Work- Application.

TEXT BOOKS:

1. Engineering Mechanics: R.K. Bansal, Laxmi publications.
2. Engineering Mechanics: S.S. Bavakatti, New age International.
3. Engineering Mechanics Statics & Dynamics: N.H. Dubey McGraw Hill International Edition.

REFERENCE BOOKS:

1. Timoshenko S.P and Young D.H., "Engineering Mechanics", McGraw Hill International Edition.
2. Beer F.P & Johnston E.R Jr. Vector, "Mechanics for Engineers", TMH, 2004.
3. Hibbeler R.C & Ashok Gupta, "Engineering Mechanics", Pearson Education, 2010.
4. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
5. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2008.
6. Meriam. J. L., "Engineering Mechanics", Volume-II Dynamics, John Wiley & Sons, 2008.



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CIVIL ENGINEERING

B.Tech I Year I Semester

**L/T/P/C
-/-/3/1.5**

ENGINEERING PHYSICS LAB (D1BSEP2)

COURSE OBJECTIVES

1. Study of the wavelength and V-I characteristics of laser diode.
2. Understand the numerical aperture and bending loss of an optical fiber.
3. Study the variation of current with voltage of optoelectronic devices.
4. Understand the Hall Effect in semiconductor.
5. Acquire the knowledge to find Plank's constant using photoelectric effect experiment.

COURSE OUTCOMES

1. Identify the V-I characteristics of Laser diode.
2. Evaluate the numerical aperture and bending loss of a given optical fiber.
3. Analyze the V-I characteristics of LED and photodiode devices.
4. Identify the type of semiconductor by using Hall Effect experiment.
5. Measure the Plank's constant using Photocell.

LIST OF EXPERIMENTS:

1. Energy Band gap: To determine the energy band gap of a given semiconductor diode.
2. Plank's Constant: To determine the Plank's constant using photoelectric effect.
3. Hall Effect: To evaluate the Hall coefficient of a given semiconductor.
4. Stewart and Gee's Experiment: To determine the magnetic field on the axis of a current carrying coil
5. LED: To study the V-I characteristics of Light Emitting Diode.
6. Laser diode: To study the V-I characteristics of semiconductor laser diode.
7. Laser Diffraction: To determine the wavelength of given Laser beam.
8. Numerical aperture & Bending losses: To determine the numerical aperture of an optical fiber and to estimate the bending loss in an optical fiber.
9. Photodiode: To study the V-I characteristics and measure the dark current in the photodiode.
10. Solar Cell: To find the fill factor of solar cell using V-I characteristics.
11. LCR Circuit: To determine the series and parallel resonance frequency using LCR experiment.

Note: Any nine experiments are to be performed compulsory

REFERENCE BOOKS:

1. Ruby Das, Rajesh Kumar, C. S. Robinson, Prashanth Kumar Sahu, A Textbook of Engineering Physics Practical, Second Edition, University Science Press, New Delhi, 2016.
2. C.V. Madhusudana Rao, V. Vasanth Kumar, Engineering Physics Lab Manual, Scitech publications(India) Pvt.Ltd.-2014
3. Dr.Y. Aparna & Dr .K.VenkateswaraRao, Laboratory Manual of Engineering Physics, V.G.S Book Links, Vijayawada,2010



CIVIL ENGINEERING

B. Tech I Year I Semester

L/T/P/C

0/1/2/2

COMPUTER AIDED DRAWING LAB (D1ESDW)

COURSE OBJECTIVES:

1. To Provide Basic Concepts of AutoCAD.
2. To Impart Knowledge about Standard Principles of Computer Engineering Drawing.
3. To Draw the Basic Blocks of Drawing Elements Using Computer.
4. To Draw Various Solids Using AutoCAD.

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 & Interpret Engineering Drawings.

LIST OF EXPERIMENTS IN DETAIL:

1. Introduction and Practice on Computer Aided Drafting (CAD)
 - a. Introduction to AutoCAD Package.
 - b. Menu Operations in AutoCAD.
 - c. Practices the Methods of Selecting/Entering Commands to Start New Drawing Accessing AutoCAD Commands by Selecting from Menus, toolbars and Entering Commands on Command Line.
 - d. Sets the Limits of the Drawing to Get the Needed Working Area.
 - e. Practices the Setting Commands – Grid, Snap & Ortho Commands.
 - f. Practices Draw Commands – Point, Line, Pline, Rectangle, Circle, Arc, Polygon. Mention the Dimensions of the given Figures.
 - g. Practices ‘Modify Commands – Erase, Copy, Mirror, Move, Rotate, Scale, Stretch, Trim, Extend, Break, Chamfer, Fillet, Explode.
 - h. Practices Construct Commands – offset, Array, Divide, Measure.
 - i. Practices Edit Commands – Undo, Redo, Oops, Copy Clip, Paste Clip, Del.
 - j. Practices Hatch Commands – Hatch.
 - k. Practices Insert Commands – Block, Wblock, Insert.
2. Drawing Isometric View of Simple Objects by Orthographic Views.
3. Drawing of Front View and top View of Simple Solids Like Prism, Pyramid, Cylinder and Cone and Dimensioning.
4. Drawing of Simple Plans & Sections of Buildings [2BHK / 3BHK] using AutoCAD Software.

TEXT BOOKS:

1. Computer Aided Design Laboratory by M.N. Sessa Prakash & Dr.G.S.Servesesh – Laxmi Publications (P) Ltd., New Delhi.
2. Engineering Drawing N.D.Bhatt, Charotar Publications.
3. Engineering Drawing by N. S. Parthasarathy and Vela Murali, Oxford University Press, New Delhi.

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and MC Agrawal, Tata McGraw Hill Publishing Co. Pvt. Ltd., New Delhi.
2. Engineering Drawing / M.B. Shah, B.C. Rane, Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al. CBS Publishers.



CIVIL ENGINEERING

B. Tech I year I Semester

L/T/P/C

0/0/2/1

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB (D1ESBEE2)

Prerequisites: Basic Electrical Engineering

Course Objectives:

1. Students will gain the basic knowledge of electrical circuits using various laws.
2. Identify and apply different theorems for electrical circuits.
3. Assess the performance of different types of Electrical machines and single phase transformer.
4. Apply basic electrical engineering knowledge for house wiring practice.
5. To identify various components and testing of active devices.
6. Ability to understand the characteristics of various devices.

Course Outcomes:

After the completion of this laboratory course, the student will be able to

1. Apply various laws to solve electrical networks.
2. Apply network theorems to solve complex electrical networks.
3. Evaluate the performance of different types of Electrical machines and single phase transformer by conducting various tests.
4. Understand and analyze electrical installations using different lamp controlled methods, stair case wiring and different wiring connection.
5. Understand to design different circuits.
6. Apply various devices to real time problems.

List of Experiments: (Any 10 Experiments)

1. Verification of Kirchhoff's current and voltage laws.
2. To study and verify Thevenin's and Nortons theorems.
3. To verify superposition and Reciprocity theorems.
4. Magnetization characteristics of DC shunt generator.
5. To perform open circuit and short circuit test on single phase transformer.
6. Make circuit for series and parallel connection of lamps.
7. Make a circuit for stair case wiring.
8. Forward And Reverse Bias V-I Characteristics Of PN Junction Diode.
9. Zener Diode V-I Characteristics.
10. Half Wave Rectifier With and With Out Filter.
11. Full Wave Rectifier With and With Out Filter.
12. Input and Output Characteristics of BJT in CB Configuration.
13. Input and Output Characteristics of BJT in CE Configuration.
14. Study of Logic gates.



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CIVIL ENGINEERING

B.Tech I Year I Semester

**L/T/P/C
0/0/3/1.5**

BASIC WORKSHOP (D1ESBW1)

Course Objectives:

1. To Study different hand operated power tools, uses and their demonstration.
2. To gain basic working knowledge required for the production of engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at workplace.
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. To identify and use marking tools, hand tools, measuring equipment and to work in order to obtain prescribed tolerances.

Course Outcomes:

Completion of the course, the students will be able to:

1. Ability to design and model different prototypes in the carpentry trade such as cross lap joint, Dove tail joint.
2. Ability to design and model various basic prototypes in the trade of fitting such as straight and L fit.
3. Ability to make various basic prototypes in the trade of Tin smithy such as rectangular tray, Scoop.
4. Ability to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, Series wiring.
5. Ability to design and model various basic prototypes in the trade of Welding such as Lap joint, Butt joint.

TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Machine shop
2. Carpentry shop
3. Fitting shop
4. Electrical Wiring / House wiring
5. Welding shop (Arc welding and Gas welding)
6. Black Smithy, Tin-Smithy and Development of jobs carried out and soldering

TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Metal Cutting (Power Hack saw machine), Metal Cutting (Water Plasma),
Power tools in construction, Foundry.

TEXT BOOKS:

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



CIVIL ENGINEERING

B.Tech I Year II Semester

**L/T/P/C
3/1/0/4**

NUMERICAL METHODS AND APPLICATIONS (D2BSM2)

Pre-requisites: Mathematical Knowledge at pre-university level

COURSE OBJECTIVES:

To Learn

1. The objective of this course is to familiarize the prospective engineers with techniques in numerical methods.
2. It aims to equip the students to deal with advanced level of mathematics and application that would be essential for their disciplines
3. The topics of those deals with methods to find roots of an equation.
4. The topics of integration that deals using numerical techniques.
5. The topics deals with the solution of PDE using numerical methods.

COURSE OUTCOMES:

After learning the contents of this paper the student must be able to

1. Find the root of an equation using numerical methods.
2. Finding integral values using numerical techniques.
3. To find the numerical solution of PDE.
4. Learn the methods of interpolation
5. Solve the problems using numerical differentiation

UNIT I:

Solution of Algebraic and transcendental equations: Bisection method- Newton-Raphson method and Regula-falsi method, Iteration method, Gauss jacobi and Gauss Siedal methods.

UNIT II:

Interpolation and Integration: Finite differences- interpolation using Newton's forward and back ward difference formulae. Central difference interpolation- Gauss' forward and backward formulae. Interpolation with unequal intervals newton's divided difference and Lagrange's formulae.

UNIT III:

Numerical Differentiation & Integration: Numerical Differentiation -Numerical Integration- Trapezoidal rule and Simpson's 1/3 and 3/8 rules

UNIT IV:

Numerical solutions of Ordinary Differential Equations: Ordinary differential equations- Taylor's series- Euler and modified Euler's methods. Runge- Kutta method of fourth order for solving first and second order equations.

UNIT V:

Numerical Solutions of Partial Differential Equations: Partial differential equations finite difference solution two dimensional Laplace equation and poisson equation- implicit and explicit methods for one dimensional heat equation (bender-Schmidt and crank-Nicholson methods) finite difference explicit method for wave equation.

TEXT BOOKS

1. Ramana B.V.- Higher Engineering Mathematics- Tata McGraw Hill New Delhi- 11th Reprint- 2010.
2. Engineering Mathematics by TKV Iyengar, B. Krishna Gandhi, S. Chand and publications
3. N.P. Bali and Manish Goyal- A text book of engineering Mathematics- Laxmi Publications- Reprint- 2008.
4. B.S. Grewal- Higher Engineering Mathematics- Khanna Publishers- 40th Edition- 2015

REFERENCE BOOKS

1. Erwin Kreyszig –Advanced Engineering Mathematics- 10th Edition- Wiley – 2021
2. S.S.Sastry introductory methods of numerical analysis- PHI-4th edition 2005
3. VeerarajanT.- Engineering Mathematics for first year-TATAMcGraw-Hill- New delhi- 2008.

**CIVIL ENGINEERING****B.Tech I Year II Semester****L/T/P/C
3/0/0/3****C PROGRAMMING FOR PROBLEM SOLVING (D2ESCP1)****Course Objective:**

Learn the fundamentals of computers and C Programming concepts.

Course Outcomes:

After learning the contents of this course, the student must be able to

1. Learn the taxonomy of computers and C fundamentals
2. Demonstrate arrays and functions to write c programming
3. Write C programs using pointers and strings
4. Analyze and write C programs using structures and unions
5. Develop C programs for various applications using file I/O functions.

UNIT I:**Introduction to Computers Data Representation**

Number Systems, Computer Languages, Algorithms. Introduction to C Language: Data types, Operators, Expressions, Library Functions, Statements-Selection Statements – if and Switch Statements, Repetition (Loop) statements.

UNIT II:**Arrays**

One and Two dimensional arrays, Multi-dimensional arrays, Inter function communication arrays applications - linear search, binary search, bubble sort, Implementation of stacks and queues.

Functions: Scope and Extent, storage classes, recursive functions.

UNIT III:**Pointers**

Introduction, Pointers for inter function communication, arrays of pointers, pointer arithmetic and arrays, passing an array to a function, memory allocation functions, pointers to functions, pointers to pointers.

Strings: Concepts, String Input/ Output functions, arrays of strings, string manipulation functions.

UNIT IV:**User Defined Datatypes Structure and Unions**

Initialization, accessing structures, operations on structures. Complex structures-Nested

structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self-referential structures, unions, bit fields, C programming examples, command– line arguments, pre-processor commands.

UNIT V:**Input and Output**

Concept of a file, streams, text files and binary files, file input/ output functions (standard library input/output functions for files), error handling, positioning functions (fseek, rewind and ftell).

TEXTBOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C.P. Deyand M Ghosh, Second Edition, Oxford University Press.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rd edition, Schaum’s outlines, McGraw Hill Education (India) Pvt Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
4. Basic computation and Programming with C, Subrata Saha and S.Mukherjee, Cambridge University Press.



**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
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Accredited by NBA & NAAC with 'A' Grade)



CIVIL ENGINEERING

B.Tech I Year II Semester

**L/T/P/C
2/0/0/2**

ENGLISH FOR SKILL ENHANCEMENT (D2HSE1)

Course Objectives:

This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes:

Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT I:

Chapter entitled '*Toasted English*' by **R. K. Narayan** from "*English: Language, Context and Culture*" published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

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

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

Writing: 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:

Chapter entitled ‘**Appro JRD**’ by **Sudha Murthy** from “*English: Language, Context and Culture*” published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

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

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT III:

Chapter entitled ‘**Lessons from Online Learning**’ by **F. Haider Alvi, Deborah Hurst et al** from “*English: Language, Context and Culture*” published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - 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 – Intensive Reading and Extensive Reading – Exercises for Practice

Writing: Format of a Formal Letter-Writing Formal Letters E.g., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT IV:

Chapter entitled ‘**Art and Literature**’ by **Abdul Kalam** from “*English: Language, Context and Culture*” published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice.

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

UNIT V:

Chapter entitled ‘**Go, Kiss the World**’ by **Subroto Bagchi** from “*English: Language, Context and Culture*” published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (*Covering all the other aspects of grammar which were not covered in the previous units*)

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 a Report.

Note: Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.

- **Note: 1.** As the syllabus of English given in AICTE Model Curriculum-2018 for B.Tech First Year is **Open-ended**, besides following the prescribed textbook, 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 in the class.
- **Note: 2.** Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

1. “English: Language, Context and Culture” by Orient Black Swan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1, 2, 3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd ed.). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.



CIVIL ENGINEERING

B.Tech I Year II Semester

L/T/P/C

3/1/0/4

APPLIED CHEMISTRY (D2BSAC1)

Course Objectives:

1. To bring adaptability to new developments in Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of treatment of water in Industries.
3. To acquire required knowledge about Batteries and their applications.
4. To bring Basic Knowledge of polymers and their applications.

Course Outcomes:

1. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
2. They will acquire the Knowledge of chemistry in Batteries.
3. They can learn the fundamentals and general properties of polymers and their engineering materials.
4. Students are able to understand the functioning of Engineering Materials.
5. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT I

Water and its treatment

Introduction to hardness of water – Estimation of hardness of water by complex metric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water-Disinfection of potable water by chlorination and break-point chlorination.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water –Calgon conditioning - Phosphate conditioning - Colloidal conditioning,

External treatment methods -Softening of water by ion-exchange processes. Desalination of water–Reverse osmosis.

UNIT II

Battery Chemistry & Corrosion

Introduction -Classification of batteries- primary, secondary batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of Lithium-ion battery, Applications of Li-ion battery. Fuel Cells-Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.

UNIT III**Polymeric materials**

Definition–Classification of polymers with examples– Types of polymerizations – Addition (free radical addition) and condensation polymerization with Nylon 6:6.

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite and Teflon.

Rubbers: Natural rubber and its vulcanization.

Elastomers: Characteristics–preparation–properties and applications of Buna-S, Butyl rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of Conducting polymer; trans-poly acetylene and applications of conducting polymers.

Biodegradable polymers; Concept and advantages- Poly lactic acid and Poly vinyl alcohol and Applications.

UNIT IV**Energy Sources**

Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula. **Solid fuels:** coal – analysis of coal – proximate and ultimate analysis and their significance. **Liquid fuels** – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; **Gaseous fuels** – composition and uses of natural gas, LPG and CNG, Biodiesel – Trans esterification, advantages.

UNIT V**Engineering Materials**

Cement: Portland cement, its composition, setting and hardening.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

Refractories: Classification & Characteristics of a Good Refractory.

TEXTBOOKS:

1. Engineering Chemistry, Dr. Bharathi Kumari Yalamanchili, VGS Techno series Publishing Company, 2018
2. Engineering Chemistry P.C. Jain and M. Jain, Dhanpatrai & CO Publishing Company, 2010
3. Engineering Chemistry Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
4. A textbook of Engineering Chemistry M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
5. Textbook of Engineering Chemistry Jaya Shree Anireddy, Wiley Publications.

REFERENCEBOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015).
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011).



CIVIL ENGINEERING

B.Tech I Year II Semester

L/T/P/C

1/0/4/3

ENGINEERING GRAPHICS (D2ESEG1)

COURSE OBJECTIVES:

This subject aims to

1. The student will be able to understand importance of dimensioning in large scale drawings used as design initiation in manufacturing and will be able to understand the significance of different kinds of pencils used for drawing different types of lines.
2. The subject will ensure the student to learn basics of drawing like conics, scales etc.
3. The student will be able to understand in detail about the coordinate system the topics to be able to locate the points in all the 4 quadrants.
4. The student will be introduced to topics like lines, planes and solids and their position w.r.t. HP and VP in simple position, inclined to one and both reference planes.
5. The student will also be introduced to topics like development of surfaces, perspective views, Isometric projections, orthographic projections.

COURSE OUTCOMES:

Upon completion of the course the graduate will be able

1. To draw lines, curves and show dimensions as per BIS standards.
2. For a given four quadrant system, able to find the position of an object in any one of the four quadrants with respect to observer, object and the reference planes and to construct the projections for points, lines and planes.
3. To prepare sectional views of a 3D object for understanding internal construction details.
4. To develop 3D Solids and able to visualize the object in simple and in section.
5. To construct Top View, Front View and Side View for a given three-dimensional object.

UNIT I

Introduction to Engineering Drawing

Principles of Engineering Graphics and their Significance, Usage of Instruments, Conic Sections- (Ellipse, Parabola, Hyperbola and Rectangular Hyperbola) General method only. Cycloid, Epicycloid and Hypocycloid Involutés.

UNIT II

Orthographic Projections

Principles of Orthographic Projections – Conventions – Projections of Points and Lines inclined to both principal planes.

Projections of Planes: Projections of Plane regular geometric figures inclined One and to both principal planes, Regular planes such as square, rectangle, Rhombus, triangle, pentagon, Hexagon, Circle, Semi circle.

Unit III

Projections of Regular Solids

Projections of Regular Solids axis parallel, perpendicular and inclined to reference Planes. The regular solids are prisms, pyramids, Cone and cylinder.

UNIT IV

Section of Solids: Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views

Development of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Pyramid, Cylinder and Cone.

UNIT V

Isometric Projections

Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Plane Figures, Simple & Compound solids- Conversion of Isometric Views to Orthographic views and vice versa.

TEXT BOOKS:

1. Engineering Drawing, Basant Agrawal and Mc Agrawal, Mc Graw Hill.
2. Engineering Drawing, Gopala Krishna, Subhas Stores.

REFERENCE BOOKS:

1. Engineering Drawing, N.S. Parthasarathy and Vela Murali, Oxford.
2. Engineering Drawing, N.D. Bhatt, Charotar.



CIVIL ENGINEERING

B.Tech I Year II Semester

L/T/P/C
0/0/3/1.5

APPLIED CHEMISTRY LAB (D2BSAC2)

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 of water to check its suitability for drinking purpose.
2. Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
3. Students will learn to prepare polymers.
4. Students will learn skills related to the lubricant properties such as surface tension and viscosity of oils.

Course Outcomes

The experiments will make the student gain skills on:

1. The concepts of error and its analysis and can also develop the skills to tabulate the experimental data and derive valid conclusions.
2. Hands on experience in performing the electro-analytical techniques such as conductometry, potentiometry and pH metry.
3. The ability to prepare polymers.
4. Estimation of Surface tension and viscosity of Lubricant oil.

List of Experiments:

1. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.
2. **Conductometry:** Estimation of the concentration of an acid by Conductometry.
3. **Potentiometry:**
 - a) Estimation of the concentration of an acid by Potentiometry
 - b) Estimation of the amount of Fe^{+2} by Potentiometry.
4. **pH Metry:** Determination of an acid concentration using pH meter.
5. **Preparations:** Preparation of Bakelite.
6. **Lubricants:**
 - a) Estimation of acid value of given lubricant oil.
 - b) Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.
7. **Virtual lab experiments**
 - a) Construction of Fuel cell and it's working.
 - b) Smart materials for Biomedical applications

8. Additional Experiments:

- a) Thin layer Chromatography calculation of R_f values
- b) Determination of Surface tension of given liquid by using Stalagmometer.
- c) Verification of Lambert's and Beer's law using $KMnO_4$.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007)



CIVIL ENGINEERING

B.Tech I Year II Semester

L/T/P/C
0/0/3/1.5

BASIC C PROGRAMMING FOR PROBLEM SOLVING LAB (D2ESCP2)

Course Objective

Write programs in C using structured programming approach to solve the problems.

Course - Outcomes

After learning the contents of this course, the student will be able to

1. Design and test programs to solve mathematical and scientific problems.
2. Write structured programs using control structures and functions.

List of Experiments:

1.
 - a) Write a C program to find the factorial of a positive integer.
 - b) Write a C program to find the roots of a quadratic equation.
2.
 - a) Write a C program to determine if the given number is a prime number or not.
 - b) 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.
3.
 - a) Write a C program to construct a pyramid of numbers.
 - b) Write a C program to calculate the following Sum:
Sum= $1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$
4.
 - a) The Least Common Multiple (LCM) of two positive integers a & b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls GCD (a, b) function that takes two integer arguments and returns their LCM. The lcm (a, b) function should calculate the least common multiple by calling the GCD (a,b) function and using the following relation: $LCM(a,b) = ab / GCD(a,b)$
 - b) Write a C program that reads two integers n and r to compute the ncr value using the following relation: $ncr(n,r) = n! / r! (n-r)!$. Use a function for computing the factorial value of an integer.
5.
 - a) Write C program that reads two integers x and n and calls a recursive function to compute x^n .
 - b) Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
 - c) Write a C program that reads two integers and calls a recursive function to compute ncr value.
6.
 - a) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
 - b) Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.

7. 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 that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.
8.
 - a) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
 - b) Write a C program that reads two matrices and uses functions to perform the following:
 - i) Addition of two matrices
 - ii) Multiplication of two matrices
9.
 - a) Write a C program that uses functions to perform the following operations:
 - i) to insert a sub-string into a given main string from a given position.
 - ii) to delete n characters from a given position in a given string
 - b) Write a C program that uses a non-recursive function to determine if the given string is a palindrome or not.
10.
 - a) Write a C program to replace a substring with another in a given line of text.
 - b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
11.
 - a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
 - b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.
12.
 - 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.
13.
 - a) 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.
 - b) Write a C program to compare two files, printing the first line where they differ.
14.
 - a) Write a C program to change the nth character (byte) in a text file. Use fseek function.
 - b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.
15.
 - a) 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).
 - b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.
16.
 - a) Write a C Program to calculate the sum of n numbers entered by the user using malloc() and free() functions.
 - b) Write a C Program to calculate the sum of n numbers entered by the user using calloc() and free() functions.

Text Books:

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming using C in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C++: The complete reference, H. Schildt, TMH Publishers



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CIVIL ENGINEERING

B.Tech I Year II Semester

**L/T/P/C
0/0/2/1**

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB (D2HSE2)

The **English Language and Communication Skills (ELCS) 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 the 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 the impact of dialects.
5. To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to:

1. Understand the nuances of English language through audio- visual experience and group activities
2. Neutralise their accent for intelligibility
3. Speak 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 the 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
 - Describing objects/situations/people
 - Role play – Individual/Group activities
 - Just A Minute (JAM) Sessions

The following course content is prescribed for the **English Language and Communication Skills Lab**.

Exercise –I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. *Practice:* Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs-Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English. *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– Weak Forms and Strong Forms – Stress pattern insentences – Intonation. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern insentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication. *Practice:* Situational Dialogues – Role Play- Expressions in Various Situations – Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise –III

CALL Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI). *Practice:* Common Indian Variants in Pronunciation – Differences between British and AmericanPronunciation -*Testing Exercises*

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise –IV**CALL Lab:**

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - *Testing Exercises*

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication-Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise –V**CALL Lab:**

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab:

Understand: Group Discussion

Practice: Group Discussion

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

b) 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 T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English. Part 1,2,3.* CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook*. Cengage Learning India Pvt. Ltd.
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