



**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 - ELECTRONICS & COMMUNICATION 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 & Ordinary Differential Equations	3	1	0	4	40	60	100
2	BS	D1BSEP1	Engineering Physics	3	1	0	4	40	60	100
3	ES	D1ESFEE	Fundamentals of Electrical Engineering	2	0	0	2	40	60	100
4	ES	D1ESCP1	C Programming for Problem Solving	3	0	0	3	40	60	100
5	BS	D1BSEP2	Engineering Physics Lab	0	0	3	1.5	40	60	100
6	ES	D1ESFEL	Fundamentals of Electrical Engineering Lab	0	0	2	1	40	60	100
7	ES	D1ESCP3	C Programming for Problem Solving Lab	0	0	2	1	40	60	100
8	ES	D1ESITW	IT Workshop	0	0	2	1	40	60	100
9	ES	D1ESEW1	Engineering Workshop	0	1	3	2.5	40	60	100
TOTAL				11	3	12	20	360	540	900

SEMESTER II

S.No.	Course Classification	Course Code	Name of the subject	L	T	P	C	I	E	Total
1	BS	D2BSM3	Mathematical Transforms	3	1	0	4	40	60	100
2	BS	D2BSEC1	Engineering Chemistry	3	1	0	4	40	60	100
3	ES	D2ESED1	Electronic Devices and Circuits	2	0	0	2	40	60	100
4	HS	D2HSE1	English for Skill Enhancement	2	0	0	2	40	60	100
5	ES	D2ESCEG	Computer Aided Engineering Graphics	1	0	4	3	40	60	100
6	BS	D2BSEC2	Engineering Chemistry Lab	0	0	2	1	40	60	100
7	ES	D2ESED2	Electronic Devices and Circuits Lab	0	0	2	1	40	60	100
8	HS	D2HSE2	English Language and Communication Skills Lab	0	0	2	1	40	60	100
9	ES	D2ESPP4	Applied Python Programming Lab	0	1	2	2	40	60	100
TOTAL				11	3	12	20	360	540	900

L-Lecture hours per week; T-Tutorial hours per week; P-Practical Hours per week; I Internal marks; E-External Marks



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS (D1BSM1)

B.Tech. I Semester

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

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

Students should learn the concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations, Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form, Methods of solving the differential equations of first order, Find general solution to linear, homogeneous and non homogeneous ODEs with constant coefficients, Evaluation of double integrals.

Course Outcomes:

Upon completion of the Course, the students will be able to

1. Discuss the matrix representation of a set of linear equations and to analyses the solution of the system of equations. L4
2. Apply the concept of matrices to reduce the quadratic form to canonical form using orthogonal transformation. L3
3. Identify whether the given DE of first order is exact or not and utilizes the knowledge of ODE to solve problems on application of ODE. L3
4. Solve higher order differential equation and apply the concept of differential equation to real world problems. L3
5. Evaluating double integrals and applying them to compute the areas of regions. L5

COURSE CODE- CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101.1	3	2										
C101.2	2	2	2									
C101.3	2	2	2									
C101.4	3	3	3									
C101.5	2	2										

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 application
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- 10th Edition- Wiley - 2021
3. Advanced Engineering Mathematics by S.R.K. Iyengar R.K. Jain – Narosa Publications.



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

ENGINEERING PHYSICS (D1BSEP1)

B.Tech. I Semester

L/T/P/C

3/1/0/4

COURSE OBJECTIVES

This course aims to provide a solid understanding of the basic principles of quantum physics and band theory of solids. It covers the underlying mechanisms involved in the construction and working principles of various semiconductor devices. After completion of the course students will gain fundamental knowledge related to dielectric and energy materials. The course also explores the fundamental concepts of magnetic and superconducting materials. Additionally, it also includes the characteristics of lasers and optical fibres and their applications.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Analyse quantum mechanics concepts and distinguish between conductors, semiconductors, and insulators by classifying solids. L4
2. Explore the influence of semiconductor devices in various science and engineering applications. L3
3. Demonstrate the fundamental properties of dielectric and energy materials for their day to day applications. L3
4. Inculcate a deep understanding of magnetic and superconducting materials for diverse engineering applications. L4
5. Classify the key aspects of lasers and optical fibres and analyse their applications across various fields. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C102.1	2	3										
C102.2	2	2	3									
C102.3	2	2	3									
C102.4	3	3	3									
C102.5	2	3										

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 .

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

TEXT BOOKS:

1. P.K PalaniSwami, Engineering Physics-II, 2nd edition Scitech Publications- 2012.
2. P.K PalaniSwami, Engineering Physics, 4th edition Scitech Publications- 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, Mc Graw 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

B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING
FUNDAMENTALS OF ELECTRICAL ENGINEERING (D1ESFEE)

B. Tech. I Year I Semester

L/T/P/C

2/0/0/2

Prerequisites: Linear Algebra and Calculus

COURSE OBJECTIVES:

1. To introduce the concept of DC and AC electrical circuits and its applications.
2. To determine the performance of single phase transformer.
3. To study the concepts of different types of Electrical Machines.
4. To acquire knowledge about various configurations for electrical installations and its applications.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Apply principles of DC circuits to analyze and solve problems using various theorems. L3
2. Analyze AC electrical circuits to evaluate their performance and identify potential improvements. L4.
3. Examine the characteristics and performance metrics of electrical machines to optimize their usage in practical applications. L4
4. Apply knowledge of transformer principles to understand its characteristics and predict performance in various scenarios. L3
5. Describe the applications of different electrical installations and analyze their practical implications. L4

[illegible]

UNIT-I: DC Circuits: Electrical circuit elements (R,L and C),Dependent and Independent of voltage and currents sources, Kirchhoff current and voltage laws, Analysis of Resistive circuits- Mesh, Nodal Analysis and Star-Delta Transformations, Superposition, Reciprocity, Thevenin, Norton, Maximum Power Transfer Theorems, Numerical problems.

UNIT-II: AC Circuits AC Fundamentals: Sinusoidal voltage and currents, mathematical and graphical representation, concept of cycle period, frequency, instantaneous, peak, average, RMS values, peak factor, form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC and RLC combinations (series) Three phase balanced circuits, voltage and current relations in star.

UNIT-III: Transformers: Magnetic circuits, Construction and working principle of Ideal and Practical Transformer, Equivalent Circuit, Losses in Transformers, Regulation and Efficiency, OC &SC test on 1-phase Transformer. Auto- Transformer.

UNIT-IV: Electrical Machines: Construction of DC machines, Armature windings–DC Generator– Principle of operation-EMF Equation– DC Motor – Principle of operation – Back EMF - Torque Equation, Generation of rotating magnetic fields, Construction and working principle of a three-phase and Single-phase induction motor, torque-speed characteristics, Construction and working principle of synchronous generators.

UNIT-V: Electrical Installations: Basic concept of wiring systems, Service Mains, Meter board and Distribution board, Concept of Earthing. Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXT BOOKS:

1. D.P.Kothari and I.J.Nagrath,“Basic Electrical Engineering”, Tata Mc Graw Hill,2010.
2. S.K.Bhattacharya, “Electrical installations and House wiring”, Pearson Publications.

REFERENCE BOOKS:

1. S.K.Bhattacharya, “Basic Electrical & Electronics Engineering” PearsonPublications.
2. V.N.Mittal and Arvind Mittal;, “Basic Electrical Engineering” Mc Graw Hill.
3. Edward Hughes, “Electrical Technology, ”,Pearson Education.
4. Edminister.J., “Electrical Circuits” Schaum’s Outline Series, Tata Mc Graw Hill.
5. Sudhakar and Shyam Mohan, “Circuits and Networks Analysis and Synthesis, TataMc Graw Hil



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B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

C PROGRAMMING FOR PROBLEM SOLVING (D1ESCP1)

B.Tech. I Semester

L/T/P/C

3/0/0/3

COURSE OBJECTIVE: Learn the fundamentals of computers and C Programming concepts.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Develop programs using the taxonomy of C Programming Language: Data types, Operators, Expressions, selection and repetition statements. L3
2. Utilize arrays, functions, recursion, and scope, storage classes in developing C programs, implement stacks and queues and apply search and sorting algorithms on arrays. L3
3. Construct C programs using pointers and strings. L3
4. Develop C programs using structures, unions and analyze preprocessor commands and command line arguments. L4
5. Develop C programs for various applications using file I/O functions. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C104.1	2											
C104.2	2											
C104.3	2											
C104.4	3	3	3									
C104.5	3	3	2									

Unit-I: Introduction to Computers Data Representation Number Systems, Computer Languages, and 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 Data types 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).

TEXT BOOKS:

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. Dey and 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, Mc Graw 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.



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

ENGINEERING PHYSICS LAB (D1BSEP2)

B.Tech. I Semester

L/T/P/C

0/0/2/1.5

COURSE OBJECTIVES

This course includes the examination of the wavelength and V-I characteristics of laser diodes. It covers the comprehension of the numerical aperture and bending loss in optical fibres. Students will explore the variation of current with voltage in optoelectronic devices. The curriculum also covers the Hall Effect in semiconductors. Furthermore, students will learn how to experimentally determine Planck's constant.

COURSE OUTCOMES

Upon completion of the Lab, the students will be able to

1. Illustrate the V-I characteristics of Laser diode. L3
2. Evaluate the numerical aperture and bending loss of given optical fibre. L5
3. Analyse the V-I characteristics of LED and photodiode devices. L4
4. Illustrate the type of semiconductor by using Hall Effect experiment. L3
5. Calculate the Planck's constant using Photocell. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C105.1	3	3			2.67				2.67	2		
C105.2	3	3			2							
C105.3	3	3			2.5							
C105.4	3	3			2.33							2
C105.5	3	3							3	2.33	2	2

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 fibre and to estimate the bending loss in an optical fibre.
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



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B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

FUNDAMENTALS OF ELECTRICAL ENGINEERING LAB (D1ESFEL)

B.Tech. I Semester

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

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.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Asses an electrical network using various laws to identify solutions and understand network behaviour. L5
2. Verify complex electrical networks by applying network theorems to determine solutions and assess network performance. L5
3. Develop single-phase AC circuits to determine their operational characteristics and performance. L5
4. Evaluate the performance of different types of Electrical machines and single phase transformer by conducting various tests. L5
5. Design electrical installations using different lamp controlled methods, staircase wiring and different wiring connection. L5

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C106.1	2	2	2						2	2		
C106.2	2	2	1						2	2		
C106.3	2	1	1						2	1		
C106.4	1	1	2						1	2		
C106.5	2	1	1						2	2		

List of Experiments: (Any10 Experiments)

1. Verification of Kirchhoff's current and voltage laws.
2. Verification of Thevenin and Norton theorems.
3. Verification of superposition theorem and Reciprocity theorems.
4. Performance Characteristics of a Three- phase Induction Motor.

5. Magnetization characteristics of DC shunt generator.
6. Conduct brake test on dc shunt motor.
7. Conduct load test on single phase transformer. (Calculate Efficiency and Regulation).
8. To perform open circuit and short circuit test on single phase transformer.
9. Make circuit for series and parallel connection of lamps.
10. Make a circuit for one lamp controlled by one switch with PVC surface conduit system.
11. Make a circuit for two lamps controlled by two switches with PVC surface on duit system.
12. Make a circuit for staircase wiring.
13. Make a circuit for Godown wiring.
14. Make a electrical bell connection practice board.



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

C PROGRAMMING FOR PROBLEMS SOLVING LAB (D1ESCP3)

B.Tech. I Semester

L/T/P/C

0/0/2/1

COURSE OBJECTIVE

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

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Develop C programs to solve mathematical and scientific problems.L3
2. Develop C programs to work on files. L3.
3. Construct C programs to understand the memory allocation functions. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C107.1	3	3	2.67									
C107.2	3	32.67										
C107.3												

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.
a. 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) 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: $LCM(a,b) = ab / GCD(a,b)$
a. 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.
4. a) Write C program that reads two integers x and n and calls a recursive function to compute x^n .
a. Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
b. Write a C program that reads two integers and calls a recursive function to compute ncr value.
5. 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.
a. 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.
6. 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.

- a. 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.
- 7 a) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
 - a. Write a C program that reads two matrices and uses functions to perform the following:
 - 8 Addition of two matrices
 - 9 Multiplication of two matrices
 - 10 a) Write a C program that uses functions to perform the following operations:
 - 11 To insert a sub-string into a given main string from a given position.
 - 12 To delete n characters from a given position in a given String
 - 13 a) Write a C program that uses a non-recursive function to determine if the given string is a palindrome or not.
 - 14 a) Write a C program to replace a substring with another in a given line of text.
 - 15 a) Write a C program that reads 15 names each of upto 30 characters, stores the minan array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
 - 16 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.
 - 17 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.
 - 18 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.
 - 19 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.



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

IT WORKSHOP (D1ESITW)

B.Tech. I Semester

L/T/P/C

0/0/2/1

COURSE OBJECTIVE:

Training on PC Hardware, assembling, software installation, Internet, World Wide web, and usage of productivity tools for documentation, Spread sheet computations and Presentations.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Apply knowledge for computer assembling and software installation. L3
2. Solve the trouble shooting problems. L4
3. Apply the tools for preparation of PPT, Documentation and budget sheet. L3
4. Create standard documents and research documents using Latex. L5
5. Create project plans. L5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C108.1	3											
C108.2	3	3										
C108.3	3	3	3									
C108.4	3	3	3	3	3							
C108.5	3	3	3	3	3							

PC Hardware

The students should work on working PC to disassemble and assemble to working condition and install operating system like Linux or any other on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Problem 1

Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

Problem 2

Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.

Problem 3

Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.

Problem 4

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Internet & World Wide Web**Problem 5**

Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate how to access the websites and email.

Problem 6

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Problem 7

Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.

Problem 8

Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Problem 9

Develop home page: Student should learn to develop his/her home page using HTML consisting of his/her photo, name, address and education details as a table and his/her skill set as a list.

Productivity Tools**LaTeX and Word****Word Orientation**

An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Problem 10**Using LaTeX and Word**

To create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Problem 11**Creating project abstract Features to be covered**

Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Problem 12**Creating a Newsletter Features to be covered**

Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.

Problem 13**Spread sheet Orientation**

Accessing, overview of toolbars, saving spread sheet files, Using help and resources.

Creating a Scheduler

Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Problem 14**Calculating GPA Features to be covered**

Cell Referencing, Formulae in spread sheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting.

Problem 15**Creating Power Point**

Student should work on basic power point utilities and tools in Latex and Ms Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts.

Text Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft).



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

ENGINEERING WORKSHOP (D1ESW1)

B.Tech. I Semester.

L/T/P/C

0/1/3/2.5

Pre-requisites: Practical skill

COURSE OBJECTIVE

To gain knowledge of the different manufacturing processes which are commonly employed in the industry and to acquire skills in various trades for fabricating the components with the help of power tools.

COURSE OUTCOMES

Upon completion of the Course, the students will be able to

1. Learn various trades applicable to Manufacturing practices. L3
2. Acquire hands-on experience in common trades like Carpentry, Fitting, Tin-Smithy, Black Smithy, House wiring, Welding and Foundry. L3
3. Demonstrate suitable power tools (Plumbing, Metal Cutting, Wood Turning) while fabricating the components in various engineering processes. L2
4. Acquire practical knowledge on the dimensional accuracies and dimensional tolerances possible with various manufacturing processes. L3
5. Build the requirement of quality of work life on safety and organizational needs. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C108.1	3	3	2		3	2	2	2	3	3	3	3
C108.2	3	3	2		3	2	2	2	3	3	3	3
C108.3	3	3	2		3	2	2	2	3	3	3	3
C108.4	3	3	2		3	2	2	2	3	3	3	3
C108.5	3	3	2		3	2	2	2	3	3	3	3

TRADES FOR EXERCISES:

At least two exercises from each trade:

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

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



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

MATHEMATICAL TRANSFORMS (D2BSM3)

B.Tech. II Semester

L/T/P/C

3/1/0/4

Pre-requisites: Mathematical Knowledge at pre-university level

COURSE OBJECTIVE:

Students should learn the concept of evaluation of the Laplace transform of basic functions using properties, Compute inverse Laplace Transforms, Express a periodic function by Fourier series, Express a non-periodic function by Fourier Transform, Concepts and properties of Z transforms.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Apply the knowledge of L.T to Select and use the appropriate shift theorems in finding Laplace and inverse Laplace transforms. L3
2. Use Laplace transforms techniques for solving differential equations. L3
3. Solve problems to find the expansion of a given function by Fourier series. L4
4. Evaluating a non-periodic function in terms of sine and cosine transforms. L5
5. Understanding and apply Z-transforms, Inverse Z-transforms to solve difference equations. L4

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C109.1	3	2										
C109.2	2	2	2									
C109.3	2	2	2									
C109.4	3	3	3									
C109.5	2	2										

UNIT I Laplace Transforms: Laplace transforms of standard functions- shifting theorems- derivatives and integrals- properties- unit step function- Dirac's delta function- Periodic function

UNIT II Inverse Laplace transforms and applications: Inverse Laplace transforms -Shifting theorems - convolution theorem (without proof) applications- solving ordinary differential equations (initial value problems) using Laplace Transforms.

UNIT III Fourier series: Introduction- periodic function-Fourier expansion of periodic functions- Dirichlets conditions Fourier series of even and odd functions- change of interval - half-range Fourier sine and cosine Series.

UNIT IV Fourier Transforms: Fourier integral theorem (without proof)- Fourier sine and cosine integrals- sine and cosine transform-properties-inverse transforms- finite Fourier transforms.

UNIT V Z Transforms and applications: Z Transforms and inverse Z transforms-properties-damping rule-shifting properties- initial and final value theorems -convolution theorem,- applications-solution of difference equation by Z-transforms.

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
2. Reprint-2008.
3. B.S. Grewal- Higher Engineering Mathematics- Khanna Publishers- 36th Edition-2010.
4. Advanced Engineering Mathematics by S.R.K. Iyengar R.K. Jain – Narosa Publication



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B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

ENGINEERING CHEMISTRY (D2BSEC1)

B.Tech. II Semester

L/T/P/C

3/1/ 0/ 4

COURSE OBJECTIVE:

Understanding the fundamental principles of Chemistry and their Applications to an Engineering problems. Analyze properties and applications of an Engineering materials.

COURSE OUTCOMES

Upon completion of the Course, the students will be able to

1. Apply the concepts of Molecular Orbital Theory for predicting Molecular Orbital Energy level diagrams and Bond strengths. L3
2. Apply analytical techniques to assess water quality for Industrial and Domestic applications.L3
3. Learn the battery chemistry principles and construction also learn the concepts of Corrosion and preventive methods. L3
4. Analyze the properties and Calorific value of various fuels .L4
5. Explore Knowledge of Polymer materials and their properties for engineering applications. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C110.1	3	2										
C110.2	2	2	2									
C110.3	2	2	2									
C110.4	3	3	3									
C110.5	2	2										

Unit-I: Molecular Structure and Theories of Bonding: Chemical bonding: Introduction to atomic and molecular orbitals. Linear combination of atomic orbital's (LCAO). Energy level diagram of homonucleus (N_2 , O_2 and F_2) and hetero nucleus (CO and HF). II-molecular orbitals of butadiene and benzene.

Bonding in solids: Band structure of solids. The effect of doping on band structure in solids and electronic properties of materials.

UNIT-II: 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-III: Battery Chemistry & Corrosion: Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

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-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: 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 the thermosetting plastics, Preparation, Properties and engineering applications of PVC, 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.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M.Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A textbook of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS:

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



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

ELECTRONIC DEVICES & CIRCUITS (D2ESED1)

B.Tech. II Semester

L/T/P/C

2/0/0/2

Pre-requisite: Fundamentals of Semiconductors.

COURSE OBJECTIVE:

To introduce the concepts of various semiconductor devices like Diodes, Transistors, FET's, MOSFET'S and to impart the knowledge of various configurations, characteristics and applications of electronic circuits.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Apply the knowledge of semiconductor physics to solve the problems related to PN junction diode and Zener diode. L3
2. Analyze the working principles of rectifier circuits and filters. L4
3. Demonstrate the characteristics of transistor for different configurations. L3
4. Analyze and design the different biasing techniques of BJT. L5
5. Demonstrate FET and MOSFET characteristics. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C111.1	3	2										
C111.2	3											
C111.3	3	3	2									
C111.4	3	3	2									
C111.5	3	2										

UNIT– I: Introduction to semiconductor physics: Formation of P-type and N-type semiconductors, principle and operation of Diode, Volt-Ampere characteristics, Current components in a p-n Diode, Diode equation, Temperature dependence, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances, Break down mechanisms in Diode, Zener Diode and its Applications.

UNIT – II :Rectifiers and Filters: P-N junction diode as a Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π - section Filters(Qualitative treatment).

UNIT– III: Bipolar Junction Transistor (BJT): Principle of Operation, Transistor current components, Transistor as an Amplifier, Common Emitter, Common Base and Common Collector configurations and their Characteristics.

UNIT-IV: Transistor Biasing and Stabilization - Operating point, DC Load line, Biasing - Fixed Bias, Collector to Base Bias , Collective and Emitter Feedback Bias, Self bias, Bias stability, Stabilization against variations in V_{BE} , I_{CO} , β , Bias Compensation using Diodes and Transistors.

UNIT– V: Field Effect Transistor (FET): Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET.

Metal Oxide Semiconductor Field Effect Transistor (MOSFET): Different types of MOSFET's, Working operation and V-I Characteristics of different types of MOSFET's.

TEXT BOOKS:

1. R.L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuits”, PEI/PHI, 12th Ed, 2015.
2. J. Millman and C. C. Halkias, Satyabratajit, “Electronic Devices and Circuits”, TMH, 4th Ed. 2015.

REFERENCE BOOKS:

1. S.Salivahanan, N Suresh Kumar & A.Vallavaraj , “Electronic Devices and Circuits”
2. Sanjeev Gupta & Santosh Gupta, “Electronic Devices and Circuits”, Dhanpat Rai Publications



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B.TECH. EL ELECTRONICS & COMMUNICATION ENGINEERING ENGLISH FOR SKILL ENHANCEMENT (D2HSE1)

B.Tech.II Semester

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

COURSE OBJECTIVES:

The objective of the course is to improve the language proficiency of students in English by bettering their Listening, Speaking, Reading, Writing, Vocabulary and Grammar skills. It is intended to develop their communication skills in different professional and social situations. The course is designed in such a manner that its theoretical and practical components equip students to comprehend engineering subjects more effectively and critically.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Develop the skills to build vocabulary and use the words contextually. L3
2. Experiment with the nature and style of sensible writing and learning how to describe people, objects places, events etc. L3
3. Distinguish the different types of reading and appropriately identify and rectify grammatical errors. L4
4. Interpret the meanings of texts and comprehend the style and tone of the writing of authors. L5
5. Assess the importance of a passage text essay etc. based on its moral and ethical values. L5

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C112.1							1	2	2	3		
C112.2							1	2	2	3		
C112.3								1	2	3		
C112.4							1	1	2	2		
C112.5								2		2		

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 Black Swan, 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 Black Swan, 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.

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. Chaudhuri, Santanu Sinha. (2018).
4. Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd ed.). Sage Publications India Pvt. Ltd. (2019).
5. Technical Communication. Wiley India Pvt. Ltd. Vishwamohan, Aysha. (2013).
6. English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.



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B.TECH. EL ELECTRONICS & COMMUNICATION ENGINEERING COMPUTER AIDED ENGINEERING GRAPHICS (D2ESCEG)

B.Tech. II Semester.

L/T/P/C

1/0/4/3

COURSE OBJECTIVE

To develop the ability to visualize the different objects through Engineering drawing principles and to acquire computer drafting skills for the communication of concepts, and ideas in the design of engineering products.

COURSE OUTCOMES

Upon completion of the Course, the students will be able to

1. Apply computer-aided drafting tools and conventional methods to create engineering curves. L3
2. Acquire skills to sketch projections of points, lines and planes. L3
3. Using computer-aided graphics and conventional drafting methods for drawing projections of solids and auxiliary views. L3
4. Acquire skills in the development of surfaces for the right regular solids like prisms and pyramids. L3
5. Using computer-aided graphics and conventional methods for drafting Orthographic and Isometric views of lines, planes, and simple and compound solids. L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C113.1	3	2										
C113.2	2	2	2									
C113.3	2	2	2									
C113.4	3	3	3									
C113.5	2	2										

UNIT- I: Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics

UNIT-II: Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes

UNIT-III: Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids –Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectional views

UNIT-IV: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone,

Development of surfaces using computer aided drafting

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. Conversion of orthographic projection into isometric view using computer aided drafting.

TEXT BOOKS:

1. Engineering Drawing N.D. Bhatt, Charotar publishing house Pvt Ltd
2. Engineering Drawing and graphics Using AutoCAD Third Edition, T.Jeyapoovan, Vikas and company Ltd.

REFERENCE BOOKS:

1. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill Pvt Ltd
2. Engineering Graphics and Design, WILEY, Edition 2020
3. Engineering Drawing, M. B. Shah, B.C. Rana, Pearson.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford University press.
5. Computer Aided Engineering Drawing, Edited by K Balaveera Reddy at al- CBS Publishers

Note: - External examination is conducted in conventional mode and internal evaluation to be done by both conventional as well as using computer aided drafting



B.TECH. EL ELECTRONICS & COMMUNICATION ENGINEERING
ENGINEERING CHEMISTRY LAB (D2EBSEC2)

B.Tech.II Semester

L/T/P/C

0/0/2/1

COURSE OBJECTIVE:

Develop laboratory skills in chemical analysis and synthesis. Learn to handle and use various laboratory equipment and instruments.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Analyze the parameters like hardness in water by complexometric method.L4
2. Calculate the concentration of given solutions by using Instrumentation techniques such as Potentiometry and Conductometry.L3
3. Determine physical properties such as surface tension and viscosity of various liquids.L3
4. Synthesis Bakelite using basic preparatory technique.L4
5. Determine R_f value by using Thin layer chromatography technique (TLC).L3

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C114.1	3	3		3								
C114.2	3	3		3								
C114.3	3	3		3								
C114.4	3	3		3								
C114.5	3	3		3								

List of Experiments:

1. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometric 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 .



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B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

ELECTRONIC DEVICES & CIRCUITS LAB (D2ESED2)

B.Tech. II Semester

L/T/P/C

0/0/2/1

COURSE OBJECTIVE:

To impart the knowledge of various configurations, characteristics and applications of various electronic devices and to acquire the knowledge of various biasing circuits of Transistor.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Apply the knowledge of semiconductor physics to analyse the characteristics of diodes and transistors in different operating conditions. L4
2. Design and implement rectifier circuits along with filters using semiconductor devices. L5
3. Design and analyse the transistor biasing circuits. L4
4. Evaluate and analyse the performance of transistor based amplifiers. L4

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C115.1					3			2	3			
C115.2					3		2	2	3			
C115.3					3		3	2	3			
C115.4					3		3	2	3			

List of Experiments:

PART A: Electronic workshop practice (in 3 lab sessions):

1. Familiarization of R,L,C, Components
2. Study and operation of
 - Multimeters (Analog and Digital)
 - Function Generator
 - Regulated Power Supplies
 - CRO.
3. Familiarization of Devices, Diodes, BJT, and JFET, MOSFET's

PART B:

Note: Minimum of 10 expts. are to be done.

1. Forward & Reverse Bias Characteristics of PN Junction. Diode.
2. Zener Diode V-I Characteristics and as a Voltage Regulator
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.

5. Input & Output Characteristics of Transistor in CB Configuration.
6. Input & Output Characteristics of Transistor in CE Configuration.
7. FET Characteristics in CS Configuration.
8. Design of Fixed Bias Circuit
9. Design of Collector and Emitter feedback Circuit.
10. Design of Self Bias Circuit.
11. Transistor as an Amplifier



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. ELECTRONICS & COMMUNICATION ENGINEERING

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB (D2HSE2)

B.Tech. II Semester

L/T/P/C

0/0/ 2/1

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:

The English Language and Communication Skills Lab (ELCS) has two parts. The Computer Assisted Language Learning (CALL) Lab and Interactive Communication Skills (ICS) Lab. The objective of the CALL lab is to introduce students to Phonetics, which greatly helps in improving their pronunciation. Students are taught how to pronounce the 44 speech sounds, identify minimal pairs and comprehend what are consonant clusters, past tense and plural markers. To improve the students accent the components in the CALL lab include studying the structure of syllables; word stress; intonation and stress pattern in sentences. Errors in pronunciation made by students are identified and these errors are neutralized by detecting and getting rid of Mother Tongue Interference (MTI). The ICS lab enables students to develop their listening, speaking, reading and writing skills and use language appropriately for public speaking, group discussions and interviews.

COURSE OUTCOMES:

Upon completion of the Course, the students will be able to

1. Build the capability to listen and interpret a text and participate in situational dialogues. L3
2. Develop the skills to pronounce words appropriately and understand the significance of learning phonetics. L3
3. Distinguish between wrong and right accent and use intonation in sentences aptly. L4
4. Compare the differences between spoken and written communication. L5
5. Assess various skills used to make a presentation effective and also develop confidence in facing interviews. L5

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C116.1								1	3	3		2
C116.2									2	3		2
C116.3								1	2	3		1
C116.4									2	3		1
C116.5								1	2	3		1

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 – ICALL 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 – IICALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – 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 - IIICALL Lab:

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

ECS Lab:

Understand: Group Discussion *Practice:* Group Discussion

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:

- A. Computers with Suitable Configuration
- B. 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 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:

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

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook*. Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook*. Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook*. Oxford University Press
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities*.
5. Orient Black Swan Pvt. Ltd.
6. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach*. Cambridge University Press.



B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

APPLIED PYTHON PROGRAMMING LABORATORY (D2ESPP4)

B.Tech. II Semester

L/T/P/C

0 /1/2/2

Course Outcomes: Upon completing this course, the students will be able to

1. Build basic programs using fundamental programming constructs
2. Write and execute python codes for different applications
3. Implement on hardware boards

COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C117.1	3	2										1
C117.2	3	3	2	2								2
C117.3	2		3		3							1

LIST OF EXPERIMENTS:

Cycle - 1

1. Downloading and Installing Python and Modules

a) Python 3 on Linux

Follow the instructions given in the URL <https://docs.pythonguide.org/starting/install3/linux/>

b) Python 3 on Windows

Follow the instructions given in the URL <https://docs.python.org/3/using/windows.html>
(Please remember that Windows installation of Python is harder!)

c) pip3 on Windows and Linux

Install the Python package installer by following the instructions given in the URL <https://www.activestate.com/resources/quick-reads/how-to-install-and-use-pip3/>

d) Installing numpy and scipy

You can install any python3 package using the command `pip3 install <packagename>`

e) Installing jupyterlab

Install from pip using the command `pip install jupyterlab`

. Introduction to Python3

a) Printing your biodata on the screen

b) Printing all the primes less than a given number

c) Finding all the factors of a number and show whether it is a *perfect* number, i.e., the sum of all its factors (excluding the number itself) is equal to the number itself

3. Defining and Using Functions

a) Write a function to read data from a file and display it on the screen

b) Define a boolean function *is palindrome*(<input>)

- c) Write a function *collatz(x)* which does the following: if x is odd, $x = 3x + 1$; if x is even, then $x = x/2$. Return the number of steps it takes for $x = 1$
- d) Write a function $N(m, s) = \exp(-(x-m)^2/(2s^2))/\sqrt{2\pi}s$ that computes the Normal distribution

4. The package numpy

- a) Creating a matrix of given order $m \times n$ containing *random numbers* in the range 1 to 99999
- b) Write a program that adds, subtracts and multiplies two matrices. Provide an interface such that, based on the prompt, the function (addition, subtraction, multiplication) should be performed
- c) Write a program to solve a system of n linear equations in n variables using matrix inverse

5. The package scipy and pyplot

- a) Finding if two sets of data have the same *mean* value
- b) Plotting data read from a file
- c) Fitting a function through a set of data points using *polyfit* function
- d) Plotting a histogram of a given data set

6. The strings package

- a) Read text from a file and print the number of lines, words and characters
- b) Read text from a file and return a list of all n letter words beginning with a vowel
- c) Finding a secret message hidden in a paragraph of text
- d) Plot a histogram of words according to their length from text read from a file

Cycle -2

7. Installing OS on Raspberry Pi

- a) Installation using PiImager
- b) Installation using image file
- Downloading an Image
 - Writing the image to an SD card
 - using Linux
 - using Windows
 - Booting up

Follow the instructions given in the URL

<https://www.raspberrypi.com/documentation/computers/getting-started.html>

8. Accessing GPIO pins using Python

- a) Installing GPIO Zero library.

First, update your repositories list:

sudo apt update

Then install the package for Python 3:

sudo apt install python3-gpiozero

- b) Blinking an LED connected to one of the GPIO pin
- c) Adjusting the brightness of an LED
- d) Adjust the brightness of an LED (0 to 100, where 100 means maximum brightness) using the in-built PWM wavelength.

9. Collecting Sensor Data

- a) DHT Sensor interface
- Connect the terminals of DHT GPIO pins of Raspberry Pi.
 - Import the DHT library using *import Adafruit_DHT*
 - Read sensor data and display it on screen