



B.TECH – ELECTRONICS & COMMUNICATION ENGINEERING
Course Structure R-20

SEMESTER I

[illegible]

Mandatory Course: SPORTS

The Students need to participate in any physical activity such as sports, marathon, conducted by any college or any organization, students should produce participation certificate for clearing this course.

SEMESTER II

S.No.	Class	Course Code	Name of the Subject	L	T	P	C
1	BS	CBSM14	Transforms Theory	3	1	0	4
2	BS	CBSC5	Applied Chemistry	3	1	0	4
3	HS	CHSE1	English	2	0	0	2
4	ES	CESBE2	Basic Electrical Engineering	3	0	0	3
5	ES	CESEG1	Engineering Graphics	1	0	4	3
6	BS	CBSC6	Applied Chemistry Lab	0	0	3	1.5
7	HS	CHSE2	English Language & Communication Skills Lab	0	0	2	1
8	ES	CESBE3	Basic Electrical Engineering Lab	0	0	2	1
9	MC	MC002	Yoga	0	0	0	Satisfactory
Total Credits							19.5

Mandatory Course: YOGA

The student should undergo yoga meditation course offered by any organization or conducted by any college. Student should produce the completion certificate for clearing this course.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech I Semester
L/T/P/C
3 /1/ 0/ 4

LINEAR ALGEBRA, CALCULUS & ORDINARY DIFFERENTIAL EQUATIONS (CBSM13)

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: Upon completion of the Course, the student's 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.
2. Apply the concept of matrices to Reduce the quadratic form to canonical form using orthogonal transformation.
3. Identify whether the given DE of first order is exact or not and utilize the knowledge of ODE to solve problems on applications of first order ODE
4. Solve higher differential equation and apply the concept of differential equation to real world problems
5. Evaluating double integrals and applying them to compute the areas of regions

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2.3									
CO2	3	3	2									
CO3	3	3	2.67									
CO4	3	3	2.33									
CO5	3	3	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 and 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 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- 36th Edition-2010.
2. Ramana B.v.- Higher Engineering Mathematics- Tata McGraw Hill New Delhi- 11th Reprint- 2010.

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- 9th Edition- John Wiley & Sons- 2006.
3. Advanced Engineering Mathematics by S.R.K. Iyengar R.K. Jain – Narosa Publications.



TKR COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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Accredited by NBA & NAAC with 'A' Grade)



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech I Semester

L/T/P/C

3/ 1/ 0 /4

APPLIED PHYSICS (CBSP1)

Course Objectives:

The objectives of this course,

1. To impart the knowledge of Quantum mechanics for understanding the conduction mechanism in solids
2. To understand the physics of semiconductors and their working mechanism for their utility.

Course Outcomes: Upon completion of the Course, the student's will be able to:

1. Applying the knowledge of conduction mechanism in metals using Classical and Quantum free electron theory.
2. Calculating the charge carrier concentration using Fermi level in semiconductors
3. Investigating the light semiconductor interaction
4. Illustrating the construction and working of LED and Diode lasers
5. Distinguishing various photo diodes, low dimensional opto- electronic devices and solar cells

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2.5									2
CO2	3	3	2.33									2
CO3	3	3	2.67									
CO4	3	3	2.67									2
CO5	3	3	2.33									2

Unit I

Electron Theory of Solids:

Free electron theory-Classical & Quantum theory, Density of states, Fermi level, Occupation probability, Bloch theorem, Kronig-Penny model, E-k diagram and Effective mass. Types of materials: metals, semiconductors, and insulators.

Unit II

Introduction to Semiconductors :

Dependence of Fermi level on carrier-concentration and temperature, Intrinsic and extrinsic semiconductors, Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Hall effect and its applications.

Unit III**Light-Semiconductor Interaction:**

Types of Semiconductor materials of interest for optoelectronic devices, band gap modification, Hetero structures; Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Joint density of states, Density of states for photons, Transition rates- Fermi's golden rule, Optical loss and gain; Photovoltaic effect.

Unit IV**Semiconductor Light Emitting Diodes (LEDs) :**

Direct and indirect band gap semiconductors, Injection Electro luminescence, LED: Device structure, materials, characteristics, Laser diode, Quantum-well, wire, and dot based lasers.

Unit V**Photodetectors & Low dimensional Optoelectronic Devices:**

General properties of Photo detectors, Photo conductors, Types of semiconductor photo detectors, P-N junction, PIN and Avalanche Photodiodes; structure, materials, working principle, and characteristics, Noise limits on performance; Solar cells.

Text Books:

1. S.O. Pillai, Solid state physics, New age publications.
2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons,

Reference Books:

1. Ch. Srinivas, Ch. Seshubabu, Engineering Physics, Cengage learning publications.
2. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
3. Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL .
4. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech. I Semester
L/T/P/C
2/ 0/ 0/ 2

ELECTRONIC DEVICES (CESED1)

Pre-Requisite: Fundamentals of Semiconductors.

Course Objectives:

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

Course Outcomes: Upon completion of the Course, the student's will be able to:

1. Apply knowledge in semiconductor materials to comprehend the internal structure of PN junction.
2. Explain the Operation of special purpose devices for various applications.
3. Analyze the working principle of rectifier circuits and filters.
4. Analyzing the operation of a Bipolar Junction Transistor (BJT), and Evaluating its stability factor.
5. Explain the Operation of the FET and MOSFET characteristics.

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3											
CO3	3	3	2									
CO4	3	3	2									
CO5	3	2										

UNIT I

Introduction to Semiconductor Physics:

Formation of p-type and n-type semiconductors, principle and operation of Diode, Current components in a p-n Diode, Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

UNIT II

Special Purpose Devices:

Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

UNIT III**Rectifiers and Filters:**

P-N junction diode as a Rectifier - Half Wave Rectifier, Ripple Factor, Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits and Filters.

UNIT IV**Bipolar Junction Transistor (BJT):**

Construction, Principle of Operation, Transistor current components, Transistor as an Amplifier, Common Emitter, Common Base and Common Collector configurations and their Characteristics.

Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in V_{BE} and β , Bias Compensation using Diodes and Transistors, h-parameter analysis, small signal equivalent circuit of a transistor, Analysis of CE, CB, CC amplifiers.

UNIT V**Field Effect Transistor (FET):**

Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, FET biasing.

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. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998.

Reference Books:

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



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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech I Semester

L/T/P/C

3/0/0/3

C PROGRAMMING FOR PROBLEM SOLVING (CESCP1)

Course Objective:

The course is designed to provide complete **knowledge** of C language. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Course Outcomes: Upon completion of course the student will be able to

1. Apply number system concepts and implement basic algorithms for solving computational problems.
2. Make use of arrays and functions to write C programming
3. Make use of pointers and strings in writing C programs
4. Demonstrate Enumerated data types and data structures to develop C programs.
5. Develop C programs for various applications using files and I/O functions.

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2	3											
CO3	3											
CO4	3											
CO5	3	2										

Unit I

Introduction to Computers Data Representation

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

UNIT II

Arrays

One and two dimensional arrays, multidimensional 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, 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.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech I Semester
L/T/P/C
0/ 0/3/1.5

APPLIED PHYSICS LAB (CBSP2)

Course Objectives:

The objectives of this course,

1. To apply the theoretical knowledge of Physics through hands on experimental instruments
2. To understand the basic need of experiments.
3. To know how to measure the different physical quantities.
4. To gain the knowledge about different electrical components and basic electrical circuits.

Course Outcomes: Upon completion of course the student will be able to

1. Illustrate the V-I characteristics of Laser diode.
2. Evaluate the numerical and bending loss of given optical fiber
3. Analyze the V-I characteristics of LED and photo diode devices.
4. Illustrate the type of semiconductor by using Hall Effect experiment.
5. Calculate the Planck's constant using Photocell.

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2.67				2.67	2		
CO2	3	3	3	3	2							
CO3	3	3										
CO4	3	3	3	3	2.33							
CO5	3	3	3		3				3	2.33	2	2

List of Experiments:
Any eight experiments are compulsory

1. P-N junction diode- Determination of Energy band gap of a semiconductor.
2. Hall effect – Determination of Hall coefficient of a semiconductor.
3. Stewart and Gees experiment-Determination of magnetic field on the axis of a current carrying coil .
4. Photo electric effect-Study the spectral response of photo cell-Planck's constant.
5. Light Emitting Diode- Study of V-I characteristics and to determine knee voltage.
6. Laser Diode- Study of V-I characteristics, threshold current and slope efficiency.
7. Solar cell- Study the characteristics of a Solar cell and to find Fill factor and efficiency.
8. Photodiode-Determination of V-I characteristics of a photo diode .
9. BJT Characteristics-Study of common base and common emitter configuration of a NPN/PNP transistor.
10. Diffraction grating- To determine the wavelength of laser diode.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech I Semester

L/T/P/C

0/ 0/ 2/ 1

ELECTRONIC DEVICES LAB (CESED2)

Course Objectives:

1. To impart the knowledge of various configurations, characteristics and applications of various electronic devices.
2. Acquires the knowledge of various biasing circuits of Transistor.

Laboratory Outcomes: Upon completion of course the student will be able to

1. Apply the knowledge of semiconductor physics to analyze the characteristics of diodes, transistors and SCR in different
2. Operating conditions.
3. Evaluate and implement rectifier circuits along with filters using semiconductor devices.
4. Evaluate and analyze the transistor biasing circuits.
5. Evaluate and analyze the performance of transistor based amplifiers.

Laboratory Outcomes(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					3			2	3			
CO2					3		2	2	3			
CO3					3		3	2	3			
CO4					3		3	2	3			

List of Experiments:

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

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

PART B:

Note: Minimum of 12 expts. are to be done:

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener Diode V-I Characteristics.
3. Zener Diode as a Voltage Regulator.
4. Half Wave Rectifier with & without filters.
5. Full Wave Rectifier with & without filters.
6. I/P & O/P Characteristics of Transistor in CB Configuration.
7. I/P & O/P Characteristics of Transistor in CE Configuration.

8. Calculation of h-parameters from CE and CB configured transistor circuits.
9. FET Characteristics in CS Configuration.
10. Design of Fixed Bias Circuit.
11. Design of Collector to Base bias Circuit
12. Design of Self Bias Circuit.
13. SCR Characteristics.
14. CE Amplifier.
15. CC Amplifier.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech I Semester
L/T/P/C
0/0/3/1.5

C PROGRAMMING FOR PROBLEM SOLVING LAB (CESCP2)

Laboratory Objective:

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

Laboratory Outcomes: Upon completion of the Course, the student's will be able to:

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

Laboratory Outcomes (COs)	COURSE CODE-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	C107.1	3	3	3									
CO2	C107.2	3	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.
 - 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: $\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
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: $\text{LCM}(a,b) = ab / \text{GCD}(a,b)$
 - b) Write a C program that reads two integers n and r to compute the ncr value using the following relation: $\text{ncr}(n,r) = n! / r! (n-r)!$. 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.
 - a) Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
 - b) Write a C program 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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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech I Semester

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

IT WORKSHOP (CESIT1)

Course Objectives:

1. The IT Workshop is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
2. To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
3. To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks.
4. To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX.

Course Outcomes: Upon completion of the Course, the student's will be able to:

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

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2	3	3										
CO3	3											
CO4	3	3	3									
CO5	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**Spreadsheet Orientation**

Accessing, overview of toolbars, saving spreadsheet 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 spreadsheet – 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



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

L/T/P/C

3/1/0/4

TRANSFORM THEORY (CBSM14)

Course Objectives:

To learn:

1. Calculate the Laplace transform of basic functions using properties.
2. Compute inverse Laplace Transforms.
3. Express a periodic function by Fourier series.
4. Express a non-periodic function by Fourier Transform.
5. Concepts and properties of Z transforms.

Course Outcomes: After learning the contents of this paper the student must 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
2. Use Laplace transforms techniques for solving differential equations
3. Solve problems to find the expansion of a given function by Fourier series.
4. Evaluating a non-periodic function in terms of sine and cosine transforms.
5. Understanding and apply Z-transforms, Inverse Z-transforms to solve difference equations.

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2.3									
CO2	3	3	2									
CO3	3	3	2.67									
CO4	3	3	2.33									
CO5	3	3	2									

UNIT I

Laplace transforms:

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

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. Erwin Kreyszig- Advanced Engineering Mathematics- 9th Edition- John Wiley & Sons- 2006.
2. Ramana B.V.- Higher Engineering Mathematics- Tata McGraw Hill New Delhi- 11th Reprint- 2010.

Reference Books:

1. N.P. Bali and Manish Goyal- A text book of engineering Mathematics- Laxmi Publications - Reprint-2008.
2. B.S. Grewal- Higher Engineering Mathematics- Khanna Publishers- 36th Edition-2010.
3. Advanced Engineering Mathematics by S.R.K. Iyengar R.K. Jain – Narosa Publication.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

L/T/P/C

3/ 1/ 0/ 4

APPLIED CHEMISTRY (CBSC5)

Course Objectives:

1. To make the students understand the basic concepts and skills in chemistry and thereby induce the concepts in engineering
2. To orient the students in understanding the latest advancements in chemistry and to encouraging to develop new age devices
3. To inculcate the essence of atomic structure, electrochemistry and electroanalytical techniques to understand chemical bonding and to characterize the advanced instrument like micro-battery, solarcell, sensors etc.
4. To impart the basic knowledge water treatment methods in understanding the chemical bonding, material properties and importance of water purity for industrial and households
5. To acquire the characterization of different materials and the application of spectroscopy

Course Outcomes: Upon completion of the Course, the student's will be able to:

1. Construct the molecular orbital energy level diagrams to determine bond orders, Molecular electron configurations and magnetic properties.
2. Apply the concepts to identify the hardness, boiler troubles of water, water purification and its significance in industry and daily life.
3. Explain the working principle, Electro chemistry and applications of fuel cells.
4. Apply concepts of the Electro analytical methods.
5. Identify the molecular/atomic changes using UV-Visible, IR and NMR Spectroscopic techniques.

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2.33									
CO2	3	3	2									
CO3	3	3	2.6									
CO4	3	3	2.3									
CO5	3	3	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 homo-nucleus(N₂, O₂ and F₂) and hetero-nucleus(CO and HF). π -molecular orbital's of butadiene and benzene.

Crystal field theory (CFT): Salient features of CFT, crystal field splitting of transition metal ion d-orbital's in tetrahedral, octahedral and square planar geometries, calculation of crystal field splitting energy.

Bonding 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: hardness of water; causes of hardness; types of hardness-temporary and permanent; units of hardness; estimation of hardness of water by complexometric method(EDTA).

Municipal water treatment: specifications of potable/municipal water; steps involved in treatment of municipal/potable water-disinfection of water by chlorination, ozonolysis and UV-treatment.

Boiler feed water treatment: Boiler troubles-scales, sledges and boiler corrosion; internal treatments of water for boiler feeding-calgon conditioning, phosphate conditioning and colloidal conditioning. External treatment of water-ion exchange process, desalination of water and reverse osmosis

Unit III**Electrochemistry:**

Introduction: Electrolytic and electro chemical cells; electrode potential(E), standard electrode potential (E°) and free energy(G & G°); relation between free energy and electrode potential Nernst's equation to estimate the cell potential, Numerical problems.

Types of electrodes: Calomel, quinhydrone and glass electrode-determination of pH of a solution by using quinhydrone and glass electrode.

Electrochemical series and its applications.

Batteries: primary (Lithium cell) and secondary batteries (Lead-acid storage battery and Lithium ion battery).

Fuel cells: H_2 - O_2 and methanol- H_2 fuel cell and its applications.

Unit IV**Electroanalytical Methods:**

D.C Polarography:.. Instrumentation - Dropping mercury electrode- -polarogram. Types of Currents: Residual, Migration, Limiting. Two and Three electrode assemblies. Ilkovic equation (derivation not necessary) and its consequences. Applications of polarography in qualitative and quantitative analysis. Analysis of mixtures. Application to inorganic and organic compounds. Determination of stability constants of complexes.

Brief account of following techniques and their advantages over conventional d.c.polarography.

(i) A.C.polarography (ii) Square-wave polarography (iii) Pulse polarography (iv) Differential pulse polarography

Amperometric titrations: Principle, Instrumentation. Types and applications of amperometric titrations. Determination of SO_4^{2-} metal ions viz., Mg^{2+} , Zn^{2+} , Cu^{2+} and other substances. Cyclic Voltammetry: Principle, instrumentation, Applications. Cyclic voltammetric study of insecticide parathion.

Unit V**Spectroscopic Techniques and Applications:**

Introduction of spectroscopy: parameters for light-wavelength, wavenumber, frequency, energy, spectrum. UV-visible (electronic) spectroscopy: selection rule; types of transitions; auxochrome and chromophore; hypso-, batho-, hyper- and hypo-cromic shifts; and applications of electronic spectroscopy-Beer-Lambert's law.

Infra red (vibrational) spectroscopy: selection rules; types of molecular vibrations; calculation of frequency of bond vibration and applications of IR spectroscopy.

Micro-wave(rotational) spectroscopy: Selection rule; rotational spectra of diatomic molecules; and applications micro-wave spectroscopy.

Nuclear magnetic resonance spectroscopy (NMR): Basic concepts (NMR), instrumentation, chemical shift-factors effecting chemical shift; magnetic resonance imaging (MRI-imaging) using NMR.

Text Books:

1. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Engineering Chemistry by P. Rath, B. Ramadevi, Ch. V. R. Reddy & S. Chakroborty; Cengage publications.
3. Engineering Chemistry by M. Tirumal Chary, V. Laxminarayana & A. Shashikala; Pearson publications.

Reference Books:

1. Physical Chemistry, by P.W. Atkins.
 2. Fundamentals of Molecular Spectroscopy, by C.N. Banwell.
 3. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
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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)



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

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

ENGLISH (CHSE1)

Course Objectives:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary (Identify different types of words), Grammar (the structure and form of the language), Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Upon completion of the Course, the student's will be able to:

1. Choose appropriate forms of reading and change his /her mode of reading
2. Analyze the grammatical accuracy of his/her speech and writing.
3. Compare verities of English and the tone and style writing of different authors.
4. Interpret a text with knowledge gained while acquiring the LSRW skills.
5. Take part in interviews, group discussions JAM sessions etc.... by improving the listening and speaking skills

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2.33		2	2					2		
CO2	3	2	2									
CO3	3	2.33		2								
CO4	3	2.67			2	2						2
CO5	2.33				2					2		

UNIT I

„The Raman Effect“ from the prescribed textbook „English for Engineers“ published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes and root words.

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

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

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

UNIT II

Letter/Report writing:

Vocabulary: Synonyms, Antonyms.

Grammar: Identify Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb agreement. Tenses, Active and Passive Voice, Direct and Indirect Speech

Reading: Improving Comprehension Skills – Techniques for Good Comprehension **Writing:** Format of a Formal Letter-**Writing Formal Letters** E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT III

“Blue Jeans” from the prescribed textbook „English for Engineers” published by Cambridge University Press.

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

Grammar: Degrees of Comparison, Simple, Compound and Complex sentences.

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places process/experiment and Events.

UNIT IV

„What Should You Be Eating” from the prescribed textbook „English for Engineers” published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English, Idioms and phrases, one word substitutes.

Grammar: Redundancies and Clichés in Oral and Written Communication. **Reading:** Comprehension- Intensive Reading and Extensive Reading

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

UNIT V

„How a Chinese Billionaire Built Her Fortune” from the prescribed textbook „English for Engineers” published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage **Grammar:** Common Errors in English,

Reading: Reading Comprehension-Exercises for Practice

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

Prescribed Textbook:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.

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



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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

L/T/P/C

3 /0 /0/3

BASIC ELECTRICAL ENGINEERING (CESBE2)

Prerequisites: Linear Algebra and Calculus

Course Objectives:

Objectives of this course are

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 student's will be able to:

1. Understand and analyze DC circuits using basic principles and evaluate electrical circuits using various theorems
2. To review the basic AC circuits.
3. To design and apply the characteristics and performance of Transformers
4. To analyse the performance of Electrical machines
5. To assess the applications of various electrical installations

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2.5	2.5	2	2.5	1	1					
CO2	3	3	2.5	2	2.5	1	1					
CO3	3	2.5	2	2.5	2	1	1					
CO4	3	3	2.5	3	2.5	2	2					
CO5	2.5	2.5	2.5	2.5	2	1.5	2					

UNIT I

DC Circuits:

Electrical circuit elements (R, L and C), Dependent and Independent of voltage and current 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 and parallel). Three phase balanced circuits, voltage and current relations in star and delta connections.

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. Three-phase transformer connections.

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 McGraw Hill, 2010.
2. S.K.Bhattacharya, “Electrical installations and House Wiring”, Pearson Publications.

Reference Books:

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



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

L/T/P/C

1/ 0/ 4/ 3

ENGINEERING GRAPHICS (CESEG1)

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 to

1. Evaluate and synthesize the BIS standards and conventions employed in engineering graphics, showcasing a comprehensive understanding and proficiency in their practical application.
2. Compile advanced skills by sketching diverse engineering curves like ellipses, parabolas, cycloids, and in-volutes. Moreover, produces varied reduced scales, encompassing plain, diagonal, and Vernier scales, demonstrating a high-level synthesis and execution of knowledge.
3. Compare and evaluate the underlying principles of first-angle and third-angle methods of projection, while critically discerning the nuances between parallel and perspective projection techniques.
4. Integrate complex visual depictions of multiple views, including elevation and plan, in correlation with a designated line, plane figures, or solid objects. This involves advanced synthesis and application skills in the realm of visual representation.
5. Apply sophisticated drafting techniques and skillfully utilize 2D software, like Auto CAD, to generate detailed sketches of 2D plane figures, showcasing proficiency in the process.

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1										
CO2	2	2	2									
CO3	2	2	2									
CO4	2	2	2									
CO5	2	2										

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 Involute.

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.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

L/T/P/C

0/0/3/1.5

APPLIED CHEMISTRY LAB (CBSC6)

Course Objectives:

1. To make the students understand the basic concepts and skills in chemistry and thereby induce the concepts in engineering.
2. To orient the students in understanding the latest advancements in chemistry and to encouraging to develop new age devices.
3. To inculcate the essence of atomic structure, electrochemistry and electroanalytical techniques to understand chemical bonding and to characterize the advanced instrument like micro-battery, solarcell, sensors etc.
4. To impart the basic knowledge water treatment methods in understanding the chemical bonding, material properties and importance of water purity for industrial and households.
5. To acquire the characterization of different materials and the application of spectroscopy.

Laboratory Outcomes: Upon completion of the Course, the student's will be able to:

1. The course helps students to develop the knowledge in chemical bonds and reaction mechanisms and it is also useful to construct molecular models for biological and chemical applications.
2. Students in the course will be able to utilize and analyze characterization techniques to ascertain material quality and engineering applications.
3. The course assists to examine the chemical reactions in different environmental conditions on engineering works.
4. Students can able to estimate the viscosity of lubricants in various conditions.
5. The course supports in understanding and examining the hardness and significance of water quality for daily living and engineering.

Laboratory Outcomes(Cos)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2.67								
CO2	3	3	3	2								
CO3	3	3	3	2								
CO4	3	3	3	2.33								
CO5	3	3	3	2.33								

List of Experiments:

1. Bond length and bond angle calculation for benzene using Chem3D Pro. Software.
2. Drawing the structure benzene and graphene using ChemDraw Pro. Software.
3. Estimation of strength of HCl by conductometric titrations.
4. Determination of surface tension of a give liquid using stalagmometer.
5. Estimation of strength of HCl by Potentiometric titrations.
6. Verification of Lambert's and Beer's law using KMnO₄.
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate.
8. Synthesis of Aspirin and Paracetamol.
9. Thin layer chromatography calculation of R_f values.
10. Determination of acid value of coconut oil.
11. Verification of Freundlich adsorption isotherm-adsorption of acetic acid on activated charcoal.

12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Estimation of strength of acetic acid by conductometric titrations.
14. Estimation of Fe^{2+} amount present in unknown sample by KMnO_4 using potentiometric titration.
15. Determination of ion-exchange resin capacity using EDTA Method.
16. Determination of single electrode potential.

Text books:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi).
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi).



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

L/T/P/C

0/ 0/ 2/ 1

ENGLISH LANGUAGE & COMMUNICATION SKILLS LAB (CHSE2)

Course Objectives:

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

Laboratory Outcomes : Upon completion of the Course, the student's will be able to:

1. Analyse the skills required to listen for content and eliminate the barriers to listening.
2. Take part in JAM sessions effectively by participating in role-play and understanding situational dialogues.
3. Measure their improvement in pronunciation by working on
4. neutralization of accent
5. Distinguish between British and American pronunciation and common variants in pronunciation
6. Choosing appropriate accent for intelligibility.

Laboratory Outcomes(Cos)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		2								
CO2	3	3		2					2			
CO3	3	3								2		
CO4	3	3	3									
CO5	3	3	3							2.33		

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III**CALL Lab:**

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

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

ICS Lab:

Understand: How to make Formal Presentations,
Describing a picture

Practice: Formal Presentations-individual and team.

Exercise – IV**CALL Lab:**

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech – Extempore.

Exercise – V**CALL Lab:**

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Introduction to Interview Skills.

Practice: Mock Interviews-Role Play.

Text Books:

1. A book entitled “*ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities*” by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.

Reference :

1. Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. “*EMBARK- English for undergraduates*” Delhi: Cambridge University Press. 2016. Print.



ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech II Semester

L/T/P/C

0 / 0/ 2/ 1

BASIC ELECTRICAL ENGINEERING LAB (CESBE3)

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.

Laboratory Outcomes:

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

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

Laboratory Outcomes(Cos)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2.67				2.67	2	1	
CO2	3	3	3	3	2				2	2	1	
CO3	3	3							2	2	1	
CO4												
CO5												

List of Experiments: (Any 10 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 conduit system.
12. Make a circuit for stair case wiring.
13. Make a circuit for Godown wiring.
14. Make a electrical bell connection practice board.