Counselling Code : VBIT

VIGNANA BHARATHI Institute of Technology ®

(A UGC Autonomous Institution, Approved by AICTE, Accredited by NBA & NAAC-A Grade, Affiliated to JNTUH)

Aushapur (V), Ghatkesar (M), Medchal – Dist. Telangana State – 501 301.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

R22 B.TECH. EEE

ACADEMIC YEAR: 2023-24

I B.TECH (EEE) COURSE STRUCTURE & SYLLABUS

VIGNANA BHARATHI Institute of Technology®

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING

EFFECTIVE FROM ACADEMIC YEAR 2023 - 24 ADMITTED BATCH

R22 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	22BS1111	Matrices and Calculus	3	1	0	4
2	22BS1113	Applied Physics	3	1	0	4
3	22CS1114	C Programming and Data Structures	3	0	0	3
4	22EE1113	Electrical Circuit Analysis – I	3	0	0	3
5	22ME1156	Engineering Workshop	0	1	3	2.5
6	22EE1153	Elements of Electrical and Electronics Engineering	0	0	2	1
7	22BS1153	Applied Physics Laboratory	0	0	2	1.5
8	22CS1154	C Programming and Data Structures Laboratory	0	0	2	1
9	22MC0001	Induction Program				
		Total Credits	**13**	**2**	**10**	**20**

I Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1	22BS1211	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	22BS1212	Engineering Chemistry	3	1	0	4
3	22ME1255	Computer Aided Engineering Graphics	1	0	4	3
4	22HS1212	English for Skill Enhancement	2	0	0	2
5	22EE1215	Electrical Circuit Analysis – II	2	0	0	2
6	22BS1252	Engineering Chemistry Laboratory	0	0	3	1
7	22HS1252	English Language and Communication Skills Laboratory	0	0	2	1
8	22CS1253	Applied Python Programming Laboratory	0	1	2	2
9	22EE1255	Electrical Circuit Analysis Laboratory	0	0	2	1
10	22MC0002	Environmental Science	3	0	0	0
		Total Credits	**13**	**2**	**14**	**20**

Counselling Code : VBIT

VIGNANA BHARATHI Institute of Technology

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R22 B.Tech

EEE

2023-2024

I Year – I Semester

22BS1111-MATRICES AND CALCULUS

I B Tech. I Semester

L	T	P	C
3	1	-	4

Prerequisite(s): Mathematical knowledge at Pre university level.

Course Objectives: Develop ability to learn the concept of

1. Rank of the matrix and apply the same to know the consistency for the linear system of equations.
2. Eigen values and Eigen vectors to reduce the quadratic form to canonical form.
3. Geometrical approach to the mean value theorems and their application to the mathematical problems, Evaluation of surface areas and volumes of revolutions of curves and evaluation of improper integrals using Beta and Gamma functions.
4. Partial differentiation and Finding maxima and minima of function of two and three variables.
5. Evaluation of multiple integrals and their applications.

Course Outcomes: After successful completion of this course, the student should be able to

1. Write the matrix representation of a set of linear equations, find the rank and apply the same to analyse the solution of the system of equations.
2. Reduce the quadratic form to canonical form using orthogonal transformations by finding Eigenvalues and Eigen vectors.
3. Solve the applications on the mean value theorems, Evaluate the improper integrals using Beta and Gamma functions
4. Find the extreme values of functions of two variables with/ without constraints using partial differentiation.
5. Evaluate the multiple integrals and apply the concept to find areas and volumes.

UNIT - I: MATRICES

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

UNIT - II: EIGEN VALUES AND EIGEN VECTORS

Linear Transformation and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT - III: CALCULUS

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series (without proof). Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates for known curves (circle, parabola, ellipse), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT - IV: MULTIVARIABLE CALCULUS (PARTIAL DIFFERENTIATION AND

APPLICATIONS)

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

UNIT-V: MULTIVARIABLE CALCULUS (INTEGRATION)

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form for known curves (circle, parabola, ellipse), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers,44th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited,New Delhi.

22BS1113: APPLIED PHYSICS

B. Tech. I Year I Sem **L T P C**
3 1 0 4

Course Objectives:

The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles ofvarious semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabricationstechniques.
5. Study the characteristics of lasers and optical fibers.

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

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductorand an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering applications.
3. Explore the fundamental properties of dielectric, magnetic and energy materials fortheir applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diversefields.

UNIT-I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation, Wein's and Rayleigh-Jean's law, Planck's radiation law (Qualitative) –photo electric effect de-Broglie hypothesis and matter waves-Davisson and Germer experiment–Heisenbergun certainty principle-Born interpretation of the wave function–time independent Schrodinger wave equation-particle in one dimensional potential box.

Solids: Free electron theory (Drude &Lorentz, Sommer feld)(Qualitative) Bloch's theorem-Kronig-Penneymodel(Qualitative) origin of energy bands-classification of solids.

UNIT- II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors–Hall effect- direct and indirect band gap semiconductors- construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor(BJT)–LED, PIN diode, avalanche photo diode(APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT- III: DIELECTRIC AND MAGNETICANDENERGYMATERIALS

Dielectric Materials: Basic definitions-types of polarizations (qualitative)-ferroelectric, piezoelectric, and pyroelectric materials.

Magnetic Materials: Basic definitions – classification of Magnetic materials – Domain theory of ferromagnetism in hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance.

Energy Materials: Conductivity of liquid and solid electrolytes-super ionic conductors-materials and electrolytes for super capacitors.

UNIT-IV: NANOTECHNOLOGY

Nanoscale, quantum confinement, surface to volume ratio. **Bottom-up fabrication:** sol-gel, precipitation, combustion methods. **Top-down fabrication**: ball milling-physical vapor deposition (PVD)-chemical vapor deposition (CVD)-characterization techniques - XRD,SEM&TEM-applications of nanomaterials.

UNIT-V: LASER AND FIBEROPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action –pumping methods, CO_2 laser, Nd: YAG laser-semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber-advantages of optical Fibers-total internal reflection- construction of optical fiber-acceptance angle-numerical aperture-classification of optical fibers- losses in optical fiber-optical fiber for communication system-applications.

TEXTBOOKS:

1. M.N. Avadhanulu, P.G. Kshirsagar& TVS Arun Murthy ”A Text book of Engineering Physics”- S. Chand Publications,11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication, 2019
3. Semiconductor Physics and Devices-Basic Principle–Donald A, Neamen, Mc Graw Hill, 4th Edition, 2021.
4. B. K .Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition, 2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition2012.
2. Fundamentals of Physics–Halliday, Resnick and Walker, John Wiley & Sons, 11th Edition,2018.
3. Introduction to Solid StatePhysics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid-State Physics, S.L. Gupta and V.Kumar, Pragathi Prakashan, 2019.
5. A. K. Bhandhopadhya -Nano Materials, New Age International, 1st Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion andStorage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & Francis Group, 1st Edition, 2022.

22CS1114: C PROGRAMMING AND DATA STRUCTURES

B.Tech. I Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:

1. Learn adequate knowledge by problem solving techniques.
2. Understand programming skills using the fundamentals and basics of C Language.
3. Improve problem solving skills using arrays, strings, and functions.
4. Understand the dynamics of memory by pointers.
5. Study files creation process with access permissions.

Course Outcomes:

1. Explore the basic concepts in C Programming Language.
2. Develop modular and readable C Programs
3. Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Datastructures.
4. Apply data structures such as stacks, queues in problem solving
5. To understand and analyze various searching and sorting algorithms.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types,Variables, Constants, Input / Output

Structure of a C Program – Operators, Bit-wise operators, Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Statements.

UNIT - II

Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Recursion.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, standard functions.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two –dimensional arrays, multidimensional arrays.

UNIT - III

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility.

Pointer Applications – Passing an array to a function, Memory allocation functions: malloc(), calloc(), realoc(), free(), array of pointers

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion.

UNIT - IV

Derived types – The Typedef, enumerated types, Structures – Declaration, definition and initialization of structures, accessing structures, operations on structures, complex structures. Unions – Referencingunions, initializers, unions and structures.

Input and Output – Text vs Binary streams, standard library functions for files, converting file types, File programs – copy, merge files.

UNIT – V:

Searching and Sorting Techniques- Basic searching in an array of elements (linear and binary search techniques),

Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms)

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, CengageLearning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, PearsonEducation.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/PearsonEducation

REFERENCE BOOKS:

1. C & Data structures – P. Padmanabham, 3rd Edition, B.S. Publications.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
4. C for Engineers and Scientists, H. Cheng, McGraw-Hill International Edition
5. Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M.J. Augenstein, Pearson Education / PHI
6. C Programming & Data Structures, E. Balagurusamy, TMH.
7. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
8. C & Data structures – E V Prasad and N B Venkateswarlu, S. Chand & Co.

22EE1113: ELECTRICAL CIRCUIT ANALYSIS –I

B.Tech. I Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites: Mathematics

Course Objectives:

1. To gain knowledge in circuits and to understand the fundamentals of derived circuit laws.
2. To study and understand the analysis of single phase circuits.
3. To study and understand the different theorems.
4. To study and understand the analysis of Three-phase circuits.
5. To study and understand the concept of coupled circuits and network topology.

Course Outcomes: After completion of this course, students will be able to

1. Summarize basic laws and various techniques used in electrical circuits analysis
2. Evaluate steady state behavior of circuits for AC excitations.
3. Analyze electric circuits using network theorems.
4. Analyze the three phase balanced and unbalanced circuits.
5. Discuss the concepts of coupled circuits and network topology

UNIT-I:

Network Elements & Laws: Active elements, Independent and dependent sources. Passive elements

— R, L and C, Energy stored in inductance and capacitance, Kirchhoff's laws, Source transformations, Star-delta transformations, Node voltage method, Mesh current method including super node and supermesh analysis.

UNIT-II:

Single-Phase Circuits: RMS and average values of periodic sinusoidal and non- sinusoidal waveforms, Phasor representation, Steady-state response of series, parallel and series-parallel circuits. Impedance, Admittance, Current locus diagrams of RL and RC series and parallel circuits with variation of various parameters. Resonance: Series and parallel circuits, Bandwidth and Q-factor.

UNIT-III:

Network theorems: Superposition theorem, Thevinin's theorem, Norton's theorems, Maximum power

transfer theorem, Tellegen's theorem, Compensation theorem, Milliman's theorem and Reciprocity theorem. (AC & DC).

UNIT-IV:

Poly-phase Circuits: Analysis of balanced and unbalanced 3-phase circuits, Star and delta

connections, Measurement of three-phase power for balanced and unbalanced loads.

UNIT-V:

Coupled circuits: Concept of self and mutual inductance, Dot convention, Coefficient of coupling,Analysis of circuits with mutual inductance.

Topological Description of Networks: Graph, tree, chord, cut-set, incident matrix, circuit matrix andcut-set matrix,

TEXTBOOKS:

1. Van Valkenburg M.E, "Network Analysis", Prentice Hall of India, 3rd Edition, 2000.
2. Ravish R Singh, "Network Analysis and Synthesis", McGrawHill, 2nd Edition, 2019.

REFERENCE BOOKS:

1. B. Subramanyam, "Electric Circuit Analysis", Dreamtech Press & Wiley, 2021.
2. James W.Nilsson, Susan A.Riedel, "Electric Circuits", Pearson, 11th Edition, 2020.
3. A Sudhakar, Shyammohan S Palli, "Circuits and Networks: Analysis and Synthesis", McGrawHill, 5th Edition, 2017.
4. Jagan N.C, Lakshrninarayana C., "Network Analysis", B.S. Publications, 3rd Edition, 2014.
5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, "Engineering Circuit Analysis", McGrawHill, 6th Edition, 2002.
6. Chakravarthy A., "Circuit Theory", Dhanpat Rai & Co., First Edition, 1999.

22ME1156: ENGINEERING WORKSHOP

B.Tech. I Year I Sem. **L T P C**
0 1 3 2.5

Pre-requisites: Practical skill

Course Objectives:

1. To Study about different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at workplace.
5. It explains the construction, function, use and application of different working tools, equipment and machines.

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

1. CO1:Study and practice on machine tools and their operations
2. CO2: Practice on manufacturing of components using work shop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
3. CO3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. CO4: Apply basic electrical engineering knowledge for house wiring practice.
5. CO 5: Study and Practice of arc welding process

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry–(T-LapJ oint, 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)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

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

TEXT BOOKS:

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

REFERENCEBOOKS:

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

22EE1153: ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. I Year I Sem.

L	T	P	C
0	0	2	1

Prerequisites: Elements of Electrical Engineering

Course Objectives:

1. To measure the electrical parameters for different types of DC circuits using conventional approaches.
2. To measure the electrical parameters for different types of DC circuits using theorems approach.
3. To measure the electrical parameters for different types of AC circuits
4. To study the transient response of various R, L and C circuits using DC excitation.
5. To determine form factor for non-sinusoidal waveform

.

Course Outcomes: After completion of this course, students will be able to

1. Verify the basic conventional approaches for D C electrical circuits
2. Verify the various theorems for D.C electrical circuits
3. Calculate the electrical parameters for different types of AC circuits
4. Analyze the transient responses of R, L and C circuits for different input conditions.
5. Estimate form factor for non-sinusoidal waveform

List of experiments/demonstrations:

PART-A (compulsory)

1. Verification Ohm's Law
2. Verification of KVL
3. Verification of KCL
4. Verification of Thevenin's theorem
5. Verification of Norton's theorem
6. Verification of Superposition theorem
7. Verification of Reciprocity Theorem
8. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits

PART-B (any two experiments from the given list)

1. Verification of Milliman's Theorem.
2. Verification of Maximum Power Transfer Theorem.
3. Determination of form factor for non-sinusoidal waveform

4. Transient Response of Series RL circuit for DC excitation
5. Transient Response of Series RC circuit for DC excitation

TEXTBOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition,2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition,2008.

REFERENCE BOOKS:

1. P.Ramana, M.Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S.Chand, 2ndEdition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M.S.Sukhija, T.K.Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition,2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic ElectricalEngineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

22BS1153: APPLIED PHYSICS LABORATORY

B. Tech. I Year I Sem

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to the Hall effect and photo electric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Understand the method of least square fitting
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Study the behavior of passive components.

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

1. Know the determination of the Planck's constant using Photo electric effect and identify thematerial whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Carried out data analysis
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Learn the characteristics of passive components like L, C and R and their applications.

LIST OF EXPERIMENTS: Any 8 experiments are to be performed

1. Understanding the method of least squares– torsional pendulum as an example.
2. Determination of work function and Planck's constant using photoelectric effect.
3. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
4. Characteristics of series and parallel LCR circuits.
5. V-I characteristics of a p-n junction diode and Zener diode
6. Input and output characteristics of BJT(CE, CB & CC configurations)
7. a). V-I and L-I characteristics of light emitting diode (LED)b). V-I characteristics of a Laser diode
8. V-I Characteristics of solar cell
9. a). Determination of the beam divergence of the given LASER beam b). Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
10. Determination of Energy gap of a semiconductor.
11. Determination of time constant of RC Circuit.
12. Study B-H curve of a magnetic material.

REFERENCEBOOK:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"-S Chand Publishers, 2017.

22CS1154: C PROGRAMMING AND DATA STRUCTURES LABORATORY

B.Tech. I Year I Sem

L	T	P	C
0	0	2	1

Course Objectives:

1. To learn C-language Programs using the data types, input/ output statements and control statements.
2. Describe the importance of modular programing and arrays using C-Language Program.
3. Understand the concept and use of pointers for memory management techniques, structure, union, and enumerated types.
4. Understand the basic characteristics of text, binary files
5. Understand and C implementation of file I/O using streams.

Course Outcomes:

1. Ability to design and test programs to solve mathematical and scientific problems.
2. Ability to write structured programs using control structures and functions.
3. Able to Implement C programs using arrays & pointers.
4. Able to Use the type definition, enumerated types, define and use structures, unions in programs using C language.
5. Able to execute programs that read and write text, binary files using the formatting and character I/O functions.

List of Experiments:

WEEK-1:

a. Write a C program to find simple interest and compound interest.
b. Write a C program to convert Celsius to Fahrenheit.
c. Write a C Program to swap two numbers.
d. Write a C program to perform all arithmetic operations (+, -, *, / , %).
e. Write a simple program that prints the results of all the operators available in C (Including pre/ post increment, bitwise and/or/not , etc.). Read required operand values from standard input.

WEEK-2:

a. Write a C program to find the sum of individual digits of a positive integer.
b. 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.
c. Write a C program to generate the first n terms of the sequence.

WEEK-3:

a. Write a C program to generate all the prime numbers between 1 and n, where n is a value suppliedby the user.
b. Write a C program to find the roots of a quadratic equation.
c. Write a C program to find the factorial of a given integer.

WEEK-4:

a. Write a C program to find the GCD (greatest common divisor) of two given integers.

b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

c. Write a C program to solve Towers of Hanoi problem.

WEEK-5:

a. Write a C program to find both the largest and smallest number in a list of integers.

b. Write a C program that uses functions to perform the following:

i) Addition of Two Matrices ii) Multiplication of Two Matrices

WEEK-6:

a. Write a C program that uses functions to perform the following operations:

b. To insert a sub-string in to a given main string from a given position.

c. To delete n Characters from a given position in a given string.

WEEK-7:

a. Write a C program to determine if the given string is a palindrome or not

b. Write a C program that displays the position or index in the string S where the string T begins, or
– 1 if S doesn't contain T.

WEEK-8:

a. Write a C program to count the lines, words and characters in a given text.

b. Write a C program to generate Pascal's triangle.

c. Write a C program to construct a pyramid of numbers

WEEK-9:

a. Write a C program to read in two numbers, x and n, and then compute the sum of this geometricprogression: $1+x+x^2+x^3+\ldots+x^n$
For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum Perform error checking.
For example, the formula does not make sense for negative exponents – if n is less than 0.
Have your program print an error message if n<0, then go back and read in the next pair of numbersof without computing the sum. Are any values of x also illegal ? If so, test for them too.

b. 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 programto find the 2's complement of a binary number.

WEEK-10:

a. Write a C program to convert a Roman numeral to its decimal equivalent.

b. Write a C program that uses functions to perform the following operations:

i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

WEEK-11:

a. Write a C program which copies one file to another.
b. Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)
c. Write a C program to display the contents of a file.
d. 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)

WEEK-12:

Write a C program that implements the following sorting methods to sort a given list of integers inascending order

i) Bubble sort ii) Selection sort iii) Insertion sort

WEEK-13:

Write C programs that use both recursive and non-recursive functions to perform the followingsearching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

WEEK 14:

Write a C program that uses functions to perform the following operations on singly linkedlist.:

i) Creation ii) Insertion iii) Deletion iv) Traversal

WEEK-15:

Write C programs that implements the following data structures

i) Stacks (push,pop,display) ii) queues(insert,delete,display)

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

22MC0001: INDUCTION PROGRAM

VIGNANA BHARATHI Institute of Technology®

(A UGC Autonomous Institution, Approved by AICTE, Accredited by NBA & NAAC-A Grade, Affiliated to JNTUH)

R22 B.Tech

EEE

2023-2024

I Year – II Semester

22BS1211: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

B. Tech. I Year II Sem

L	T	P	C
3	1	0	4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: Develop ability to learn

1. Methods of solving the Ordinary Differential Equations of first order.
2. Methods of solving the higher order Ordinary Differential Equations.
3. Concept, properties of Laplace transforms& using the same to solve ordinary differential equations.
4. The physical quantities involved in engineering field related to vector valued functions
5. The basic properties of vector valued functions and their applications to vector integration.

Course Outcomes: After successful completion of this course, student should be able to

1. Identify the type of first order Ordinary Differential Equation and solve them by appropriate method.
2. Apply the concept of higher order Ordinary Differential Equations to solve real world problems.
3. Solve ordinary differential equations by using Laplace transform techniques.
4. Calculate scalar potential for a vector and directional derivative of a scalar point function using vector differentiation.
5. Evaluate the line,

UNIT-I: FIRST ORDER ODE

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates).

Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT-II: ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER

Second and higher order linear differential equations with constant coefficients: non-Homogeneous terms of the type e^{ax}, sinbx, cosbx, polynomials in xk, ve^{ax}andx V(x), method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

Applications: Electric Circuits

UNIT-III: LAPLACE TRANSFORMS

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, second shiftingtheorem (without proof), Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform bydifferent methods, convolution theorem (without proof).

Applications: Solving Initial value problems by Laplace Transform method.

UNIT-IV: VECTOR DIFFERENTIATION

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

UNIT-V: VECTOR INTEGRATION

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

TEXTBOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers,44th Edition,
2. R. K. Jain and S. R. K. lyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCEBOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G. B. Thomas and R. L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.
4. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

22BS1212- ENGINEERING CHEMISTRY

B.Tech. I Year II Sem.

L	T	P	C
3	1	0	4

Course Objectives:

1. To acquire knowledge about desalination of brackish water and treatment of municipal water
2. To include the fundamental aspects of batterychemistry, significance of corrosion and it's control to protect the structures.
3. To gain the knowledge of conducting polymers, bio-degradable polymers and fiber reinforced plastics.
4. To understand the significance of green chemistry and green synthesis and to imbibe the green chemistry principles.
5. To acquire required knowledge about engineering materials like smart materials, lubricants, and biodiesel.

Course Outcomes:

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can Substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.
4. The student can use real examples to illustrate how the principles of *green chemistry* can be applied to chemical process in engineering
5. They can predict potential applications of engineering materials and practical utility in order to become good engineers and entrepreneurs.

UNIT - I: WATER AND ITS TREATMENT:

Introduction to hardness of water – Estimation of hardness of water by complexometric 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. Defluoridation, Determination of F^- ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

UNIT – II BATTERY CHEMISTRY & CORROSION

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basicrequirements 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 batteryand 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 - III: POLYMERIC MATERIALS:

Definition – Classification of polymers with examples – Types of polymerization –addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene **Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). **Rubbers:** Natural rubber and its vulcanization.

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

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction intrans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV: GREEN CHEMISTRY AND ENGINEERING FOR SUSTAINABLE DEVELOPMENT

Definition and history of Green chemistry, Concept and principles (Prevention, Atom Economy, Less Hazardous Chemical Syntheses, Designing Safer Chemicals, Safer Solvents and Auxiliaries, Design for Energy Efficiency, Use of Renewable Feedstock, Reduce, Derivatives, Catalysis, Design for Degradation, Real-time Analysis for Pollution Prevention, Inherently Safer Chemistry for Accident Prevention) of Green Chemistry with suitable examples.

UNIT - V: ENGINEERING MATERIALS:

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinylamides

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

Bio Diesel: Sources and applications of Biodiesel

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. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.
4. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
5. Engineering Chemistry by K Sesha Maheswaramma and Mridula Chugh, Pearson 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)

22ME1255: COMPUTER AIDED ENGINEERING GRAPHICS

B.Tech. I Year II Sem. **L T P C**
1 0 4 3

Course Objectives:

1. To develop the ability of visualization of different objects through technical drawings
2. To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products
3. To draw sectional views and pictorial views for various types of solids.
4. To develop the lateral surfaces of basic engineering objects
5. To impart knowledge about standard principles of orthographic projection and isometricviews of different objects.

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

1. Apply computer aided drafting tools to create 2D and3D objects
2. sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

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, Epi cycloid and Hypo cycloid, 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. Conversionof Isometric Views to Orthographic Views and Vice-versa –Conventions. Conversion of orthographic projection into isometric view using computer aided drafting.

TEXTBOOKS:

1. Engineering Drawing N. D. Bhatt /Charotar
2. Engineering Drawing and graphics Using Auto CAD Third Edition,T. Jeyapoovan, Vikas: S. Chand and company Ltd.

REFERENCEBOOKS:

1. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition Mc Graw Hill
2. Engineering Graphics and Design, WILEY,Edition 2020
3. Engineering Drawing, M. B.Shah,B.C. Rane/Pearson.
4. Engineering Drawing, N.S.Parthasarathy and VelaMurali,Oxford
5. Computer Aided Engineering Drawing–KBalaveera Reddy et 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.

22HS1212: ENGLISH FOR SKILL ENHANCEMENT

B.Tech. I Year II Sem.

L	T	P	C
2	0	0	2

Course Objectives: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Learn remedial and functional grammar related to various grammar items.
4. Prepare the students for examinations such as IELTS and TOEFL by sharpening their reading and writing skills
5. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:

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

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 Hurstetal** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused – Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading–Intensive Reading and Extensive Reading–Exercises for Practice.

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

UNIT-IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3RMethod) – Exercises for Practice

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

UNIT-V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

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

Reading: Reading Comprehension – Exercises for Practice

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

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

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for*

*B.Tech First Year is **Open-ended***, besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.

- **Note**: **2**.Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents.They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad.2022. Print.

REFERENCEB OOKS:

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

22EE1215: ELECTRICAL CIRCUIT ANALYSIS – II

B.Tech. I Year II Sem.

L	T	P	C
2	0	0	2

Prerequisites: Mathematics

Course Objectives:

1. To study and understand the transient analysis of various R, L and C circuits for different inputs
2. To study and understand electrical circuit analysis using Laplace transforms
3. To study and understand two-port networks.
4. To study and understand Fourier Series and Integrals
5. To study and understand the concept of filters

Course Outcomes: After completion of this course, students will be able to

1. Interpret the response of various R, L and C circuits for different excitations.
2. Analyze the behavior of circuits using Laplace transforms
3. Classify and Calculate two port network parameters
4. Discuss the Fourier Series and Integrals
5. Classify and Describe various filters

UNIT-I:

Transient analysis: Transient response of R, L & C circuits, Formulation of integral differential equations, Initial conditions, Transient Response of RL, RC and RLC (series and parallel) networks subjected to internal energy, Response to impulse, step, and ramp, exponential and sinusoidal excitations.

UNIT-II:

Electrical circuit Analysis using Laplace Transforms: Application of Laplace Transforms to RL, RCand RLC (series and parallel) Networks for impulse, step, and ramp, exponential and sinusoidal excitations.

UNIT-III:

Two port network parameters: Open circuit impedance, short-circuit admittance, Transmission, Hybrid parameters & inter-relationships, Series, parallel and cascade connection of two port networks,System function, and Impedance and admittance functions.

UNIT-IV:

Fourier Series and Integral: Fourier series representation of periodic functions, Symmetry conditions, Exponential Fourier series, Discrete spectrum, Fourier integral and its properties, Continuous spectrum, Application to simple networks

UNIT-V:

Filters: Classification of filters – Low pass, High pass, Band pass and Band Elimination,

Constant-k and M-derived filters-Low pass and High pass Filters and Band pass and Band elimination filters (Elementary treatment only)

TEXTBOOKS:

1. Van Valkenburg M.E, "Network Analysis", Prentice Hall of India, 3rd Edition, 2000.
2. Ravish R Singh, "Network Analysis and Synthesis", McGrawHill, 2nd Edition, 2019.

REFERENCE BOOKS:

1. B. Subramanyam, "Electric Circuit Analysis", Dreamtech Press & Wiley, 2021.
2. James W. Nilsson, Susan A.Riedel, "Electric Circuits", Pearson, 11th Edition, 2020.
3. A Sudhakar, Shyammohan S Palli, "Circuits and Networks: Analysis and Synthesis", McGrawHill, 5th Edition, 2017.
4. Jagan N.C, Lakshrninarayana C., "Network Analysis", B.S. Publications, 3rd Edition, 2014.
5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, "Engineering Circuit Analysis", McGraw Hill, 6th Edition, 2002.
6. Chakravarthy A., "Circuit Theory", Dhanpat Rai & Co., First Edition, 1999.

22BS1252: ENGINEERING CHEMISTRY LABORATORY

B Tech. I Year II Sem

L	T	P	C
0	0	2	1

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

1. Estimation of hardness of water to check its suitability for drinking purpose.
2. Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
3. Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
4. Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.
5. Students will be able to visualize the experiments virtually for better understanding

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

1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
2. Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
3. Students are able to prepare polymers like bakelite and nylon-6.
4. Estimations saponification value, surface tension and viscosity of lubricant oils.
5. Can perform the experiments making use of working models

List of Experiments:

I. Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method.

II. Conductometry: Estimation of the concentration of an acid by Conductometry.

III. Potentiometry: Estimation of the amount of Fe^{+2} by Potentiomentry.

IV. pH Metry: Determination of an acid concentration using pH meter.

V. Preparations:

1. Preparation of Bakelite.
2. Preparation Nylon –6.

VI. Lubricants:

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VIII. Virtual lab experiments

1. Construction of Fuel cell and its working.

2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

REFERENCE BOOKS:

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

22HS1252: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

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

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

Course Outcomes: Students will be able to:

1. Make use of various online and web resources for independent language learning.
2. Understand the nuances of English language through audio-visual experience and group activities.
3. Neutralize their accent for intelligibility for enabling them to communicate with a global audience.
4. Speak with clarity and confidence which in turn improves their academic performance in the other courses.
5. Face and interact with various stakeholders leading to the enhancement of their employability skills.

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

a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills(ICS)Lab**

Listening Skills:

Objectives

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

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

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

Speaking Skills:

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

- Oral practice
- Describing objects/situations/people
- Role play–Individual/Group activities
- Just A Mine(JAM)Sessions

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

Exercise–I

CALL Lab:

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

ICS Lab:

Understand: Spoken vs. Written language – Formal and Informal English.

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

Exercise–II

CALL Lab:

Understand: Structure of Syllables–Word Stress–Weak Forms and Strong Forms– Stress pattern 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-III

CALL 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*
ICS 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 40systems, with one Master Console, LAN facility and English language learning software for self-study by students.

System Requirement (Hard ware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration
ii) High Fidelity Headphones

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

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English.Part1,2,3.*CIEFLandOxfordUniversityPress

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

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series1-4), Herbert Puchta and JeffStranks with Meredith Levy, Cambridge.
- English Pronunciation in Use(Elementary, Intermediate, Advanced)Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL&GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab(Licensed Version)

REFERENCEBOOKS:

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

22CS1253: APPLIED PYTHON PROGRAMMING LABORATORY

B.Tech. I Year II Sem

L	T	P	C
0	1	2	2

Course Objectives:

1. To learn python programming language using the data types, input/ output statements.
2. To install and run the Python interpreter
3. To learn control structures.
4. To Understand Lists, Dictionaries in python
5. To Handle Strings and Files inPython

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. Capable to implement on hardware boards
4. Able to Implement File Handling.
5. Able to deploy Small Projects using Predefined Libraries.

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.python-guide.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

2. 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 a 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.

22EE1255: ELECTRICAL CIRCUIT ANALYSIS LABORATORY

B.Tech. I Year II Sem.

L	T	P	C
0	0	2	1

Prerequisites: Elements of Electrical Engineering & Electrical Circuit Analysis

Course Objectives:

1. To draw locus diagrams of different electrical systems.
2. To measure three phase Active and Reactive power.
3. To understand concept of resonance.
4. To determine various two port network parameters
5. To determine Frequency Domain analysis using various filters.

Course Outcomes: After completion of this course, students will be able to

1. Sketch locus diagrams of different electrical systems
2. Calculate the three phase Active and Reactive power.
3. Verify the resonance in series and parallel circuits
4. **Calculate different two port network parameters**
5. **Analyze various filter circuits**

The following experiments are required to be conducted as compulsory

1. To draw the locus Diagrams of RL (R-Varying) and RC (R-Varying) Series Circuits.
2. Verification of Series and Parallel Resonance.
3. Determination of Time response of first order RL and RC circuit for periodic non –sinusoidal inputs – Time Constant and Steady state error.
4. Determination of Two port network parameters – Z and Y parameters.
5. Determination of Two port network parameters – A, B, C, D parameters.
6. Determination of Co-efficient of Coupling and Separation of Self and Mutualinductance in a Coupled Circuits.
7. Frequency domain analysis of Low-pass filter.
8. Frequency domain analysis of Band-pass filter

In addition to the above eight experiments, at least any two of the experiments fromthe following list are required to be conducted

1. Harmonic Analysis of non-sinusoidal waveform signals using Harmonic Analyzerand plotting frequency spectrum.
2. Measurement of Active Power for Star and Delta connected balanced loads.
3. Measurement of Reactive Power for Star and Delta connected balanced loads.
4. Frequency domain analysis of High-pass filter.
5. Determination of Two port network parameters – Hybrid parameters..
6. To draw the locus Diagrams of RL (L-Varying) and RC (C-Varying) Series Circuits.
7. Determination of Time response of first order RLC circuit for periodic non – sinusoidalinputs – Time Constant and Steady state error.

TEXTBOOKS:

1. Van Valkenburg M.E, "Network Analysis", Prentice Hall of India, 3rd Edition, 2000.
2. Ravish R Singh, "Network Analysis and Synthesis", McGrawHill, 2nd Edition, 2019.

REFERENCE BOOKS:

1. B. Subramanyam, "Electric Circuit Analysis", Dreamtech Press & Wiley, 2021.
2. James W.Nilsson, Susan A. Riedel, "Electric Circuits", Pearson, 11th Edition, 2020.
3. A Sudhakar, Shyammohan S Palli, "Circuits and Networks: Analysis and Synthesis", McGrawHill, 5th Edition, 2017.
4. Jagan N.C, Lakshrninarayana C., "Network Analysis", B.S. Publications, 3rd Edition, 2014.
5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, "Engineering Circuit Analysis", McGraw Hill, 6th Edition, 2002.
6. Chakravarthy A., "Circuit Theory", Dhanpat Rai & Co., First Edition, 1999.

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22MC0002: ENVIRONMENTAL SCIENCE

B.Tech. I Year II Sem.

L	T	P	C
3	0	0	0

Course Objectives:

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

Course Outcomes:

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

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste

management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

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

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan

(EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

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

REFERENCE BOOKS:

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