HYDERABAD INSTITUTE OF TECHNOLOGY AND MANAGEMENT						
B.TECH. HR-22 COURSE STRUCTURE						
ELECTRICAL AND ELECTRONICS ENGINEERING						
(Applicable for the batch admitted from 2022-23 onwards)						
Induction Program-2 Weeks						
I Year I-Semester						
S. No.	**Subject Code**	**Subject**	**Hours Per Week**			**Credits**
			L	**T**	**P**	
1	22BS1MT01	Matrix Algebra and Calculus	3	1	0	4
2	22BS1PH01	Applied Physics	3	0	0	3
3	22BS1PH02	Applied Physics Lab	0	0	2	1
4	22PC1EE01	Electrical Circuit Analysis-I	3	0	0	3
5	22ES1CS01	Problem Solving using C*	3	0	4	5
6	22HS1EG01	English for Skill Enhancement	2	0	0	2
7	22HS1EG02	English Language & Communication Skills Lab	0	0	2	1
8	22PC1EE03	Electrical Circuit Analysis-I Lab	0	0	2	1
TOTAL			**14**	**1**	**10**	**20**
Non Credit Courses						
9	22MC1HS2	Environmental Science	0	2	0	0
I Year II-Semester						
S. No.	**Subject Code**	**Subject**	**Hours Per Week**			**Credits**
			L	**T**	**P**	
1	22BS2MT02	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	22ES2ME01	Engineering Prototyping Lab	0	1	2	2
3	22ES2ME02	Design Thinking Lab	0	1	2	2
4	22ES2ME03	Computer Aided Engineering Graphics*	2	0	2	3
5	22PC2EE02	Power Systems-I	3	0	0	3
6	22ES2CS04	Problem Solving Using Python*	2	0	2	3
7	22PC2EE04	Electrical Machines – I	3	0	0	3
TOTAL			**13**	**3**	**8**	**20**
Non Credit Courses						
8	22MC2HS1	Social and Health Consciousness	0	2	0	0

B. Tech I Year–I Sem	L	T	P	C
Subject Code:22BS1MT01	3	1	0	4

MATRIX ALGEBRA AND CALCULUS
(Common to EEE/MECH/ECE/CSE/CSC/CSD/CSM/CSO)

Pre-requisite: Basics of Matrices, Differentiation and Integration

Course Objectives: To provide the student with

1. Concept of rank of a matrix and applying this concept to find the solution for system of equations, if it exists.
2. Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form of a matrix.
3. Geometrical approach to the mean value theorems and their applications to the mathematical problems.
4. Evaluation of surface areas and volumes of revolutions of curves.
5. Evaluation of improper integrals using Beta and Gamma functions.
6. Partial differentiation, concept of total derivative.
7. Finding maxima and minima of function of two and three variables.
8. Evaluation of multiple integrals and their applications.

MODULE I

Matrices: Rank of a matrix by echelon reduction, Normal form. Inverse of Non-singular matrices by Gauss-Jordan method.

System of Linear Equations: Solution of a linear algebraic system of equations (homogeneous and non-homogeneous). Gauss's-Elimination and LU decomposition method.

MODULE II

Eigen Values and Eigen Vectors: Linear Transformation and Orthogonal Transformation: Eigen values, Eigen Vectors and their properties with reference to inverse, transpose, symmetric, skew-symmetric, Hermitian, skew-Hermitian. Orthogonal and Unitary matrices. Cayley - Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem Diagonalization of a matrix, Orthogonal diagonalization of real symmetric matrices.

Quadratic form: Canonical form, Index, Signature and Nature of a quadratic form. Reduction of quadratic form to canonical form by orthogonal transformation.

MODULE III

Differential Calculus: Mean Value Theorems: Rolle's Theorem, Lagrange's theorem (Statement and Geometrical Interpretation) Cauchy's mean value theorem (Statement). Taylor's, Maclaurin's series, applications and approximation of a function by Taylor's series.

Integral Calculus: Applications of definite integrals to evaluate surface areas and volumes of revolution of curves (only in Cartesian coordinates). Improper integral: Beta and Gamma functions and their applications.

MODULE IV

Partial Differentiation: Definitions of Limit and continuity. Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Taylor's Series for two variables.

Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

MODULE V

Multiple Integrals: Double integrals: Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), change of variables (Cartesian to polar coordinates).

Triple Integrals: Evaluation of triple integrals, Change of variables (Cartesian to Spherical and Cylindrical polar coordinates).

Applications: Areas of plane region (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 36th Edition, 2010
2. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006

REFERENCE BOOKS:

1. Advanced Engineering Mathematics, R.K. Jain and S.R.K.Iyengar, Narosa publishing house, Fourth edition 2014
2. Advanced Modern Engineering Mathematics Glyn James, 5th edition, Prentice Hall, 2018.
3. Engineering Mathematics, Srimanta Pal, Subodh C. Bhunia, Oxford University Press, 2015

MOOC Courses:

1. Calculus: https://nptel.ac.in/courses/111/107/111107108/
2. Calculus: https://nptel.ac.in/courses/111/105/111105122/

E- Books:

1.Advanced Engineering Mathematics by R.K. Jain https://1lib.in/book/16822856/8e87eb
2.Higher Engineering Mathematics" B.S. Grewal https://1lib.in/book/2352263/9368cb
3.Advanced Engineering Mathematics by Erwin kreyszig https://1lib.in/book/1213502/92e465
4.Advanced Modern Engineering Mathematics by Glyn James
https://1lib.in/book/1204739/431eb2

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

CO1: Determine the rank of a matrix, solution of the system of equations, Eigen values and Eigen vectors of the matrix also canonical form of quadratic form by orthogonal transformation**s.**

CO2: Evaluate surface areas, volumes of solids of revolution, improper integrals and multiple integrals.

CO3: Find the extremum of a multi-variable function with or without constraints.

CO4: Apply Multiple integrals and mean value theorems in relevant to engineering problems.

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	1										
CO2	3	1										
CO3	3	1										
CO4	3	1										

B.Tech. I Year I Sem/II Sem **L T P C**
Course Code: 22BS1PH01/ 22BS2PH01 **3 0 0 3**

APPLIED PHYSICS
(Common to CSE/EEE/ECE/MEC/CSM/CSD/CSC/CSO)

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 of various semiconductor devices.
3. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
4. Study the characteristics of lasers and optical fibres.
5. Study the fundamental concepts related to the dielectric, magnetic and energy materials.

Pre-requisite: Basic definitions and concepts of Intermediate Physics (10+2)

Module I QUANTUM PHYSICS AND SOLIDS (12hr)
Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect – de-Broglie's hypothesis, Davisson and Germer experiment – Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box. Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

Module II SEMICONDUCTORS AND DEVICES (8hr)
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.

Module III: WAVE OPTICS & NANOTECHNOLOGY (10 hrs)
Interference: Coherence, division of amplitude and division of wave front, interference in thin films (transmitted), and Newton's rings experiment.
Diffraction: Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, diffraction grating, determination of wavelength of light using diffraction grating.

Nanotechnology: Nano scale, 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)

Module IV: LASERS AND FIBRE OPTICS (10 hrs)

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations lasing action - pumping methods- ruby laser, He-Ne laser, CO2 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.

Module V: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS (10 hrs)

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics.

Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

Text Books:

1. Applied Physics, Dr. M. N. Avadhanulu, Dr. TVS Arun Murthy, - S Chand and Company Ltd. Publications.
2. Engineering Physics, P. K. Palanisamy, SCITECH Publications, Enlarged & Revised 2014 Edition.
3. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
4. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4thEdition,2021
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.
6. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition, 2022.
7. Gerd Keiser, " Optical Fiber Communication", Mc Graw hill, 4th Edition

Reference Books:

1. Concepts of modern Physics by Arthur Beiser, McGraw-Hill Education, 7th edition, SIE
2. Semiconductor Optoelectronics: Physics and Technology, J. Singh, Mc Graw-Hill Inc., (1995).

3. Modern Engineering Physics by Dr.K.Vijaya Kumar, Dr. S.Chandralingam, S.CHAND & COMPANY LTD., Publishers.
4. Applied Physics by P.K.Mittal, I K International Publishers
5. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
6. Modern Physics R Murugeshan , Kiruthiga Sivaprasath S.Chand publications
7. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012
8. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018
9. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019
10. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019

MOOC Courses:

1. "Semiconductor Optoelectronics" By Prof. M. R. Shenoy, Department of Physics, IIT Delhi NPTEL visit http://nptel.iitm.ac.in
2. "Laser: Fundamentals and Applications" By Prof. Manabendra Chandra, IIT Kanpur NPTEL visit https://onlinecourses.nptel.ac.in/noc20_cy17

Course Outcomes:

- CO1: Explain the concepts of Quantum Physics in describing particle at micro state and its implications in formation of bands in solids
- CO2: Understand the working mechanism and characteristics of semiconductor optoelectronic devices.
- CO3: Explore the characteristics of lasers & optical fibres and their applications in various sectors by using the concepts of wave optics.
- CO4: Apply the properties of dielectric, magnetic and Nano materials in diver's fields of applications.

CO-PO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3									2		1
CO2	3									2		1
CO3	3									2		1
CO4	3									2		1

B.Tech. I Year I Sem/II Sem **L T P C**
Course Code: 22BS1PH02/ 22BS2PH02 **0 0 2 1**

APPLIED PHYSICS LAB
(Common to CSE/EEE/ECE/MEC/CSM/CSD/CSC/CSO)

Pre-requisite: Concepts of Applied Physics Theory and knowledge of intermediate (10+2) physics

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

1. Capable of handling instruments related to the Hall Effect and photoelectric 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. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behaviour of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting

List of Experiment (Perform any 8 of the following experiment)

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. V-I characteristics of a p-n junction diode and Zener diode
4. Input and output characteristics of BJT (CE configurations)
5. Diffraction Grating:
   a) To determine the wavelength of given laser and grating parameters
   b) To determine the wavelength of a given light source using grating (spectrometer)
6. Newton's Rings Experiment:
   a) To determine the radius of curvature of given Plano convex lens
7. Optical fiber:
   a) To determine Numerical aperture and Acceptance angle of a given optical fiber cable.
8. Energy band gap of Semiconductor:
   a) To determine Energy band gap of a semiconductor diode
9. Optoelectronics Devices:
   a) Light Emitting Diode: To study the V-I characteristics of LED
   b) Solar Cell: To study the V-I characteristics of Solar cell
10. Study B-H curve of a magnetic material.
11. Determination of dielectric constant of a given material
12. Characteristics of series and parallel LCR circuits.
13. Determination of the resistivity of semiconductor by two probe method.

Text Books:

1. S. Balasubramanian, M.N. Srinivasan “A Text book of Practical Physics”- S Chand Publishers, 2017
2. Laboratory manual of Engineering Physics, Dr. Y Aparna , Dr.K.Venkateswara Rao,VGS techno series, 2010.

Course Outcomes:

- CO1: Determination of the Planck’s constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
- CO2: Analyse the V-I characteristics of semiconductor optoelectronic devices.
- CO3: Describe the variations in the magnetic field, the dielectric constant, and the hysteresis curve's behaviour.
- CO 4: Apply the concepts of optics for study the characteristics of laser & fiber optical devices

CO-PO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3											1
CO2	3											1
CO3	3											1
CO4	3											1

B.Tech I Year – I Sem	**L**	**T**	**P**	**C**
Subject Code: 22PC1EE01	**3**	**0**	**0**	**3**

ELECTRICAL CIRCUIT ANALYSIS – I
(EEE)

Pre-requisite: Basic Mathematics & Physics

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To Analyze electrical circuits with the help of network theorems
3. To understand DC circuits and AC single phase & three phase circuits
4. To study the resonance in electrical circuits.

Module 1: D.C. Circuits

Current, Voltage, Power, Energy, Ohm's law, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, series, parallel circuits, analysis of simple circuits with dc excitation. Mesh and Nodal analysis, Voltage and current divide rule, source transformation technique and star-delta and delta star transformation, simple problems.

Module 2: Network Theorems

Superposition, reciprocity, Thevenin's, Norton's theorems for DC excitations, Maximum power transfer, Milliman's theorems for DC excitations, numerical problems.

Module 3: A.C. Circuits

Representation of sinusoidal waveforms, Average and rms values, peak factor and Formfactor. Real power, Reactive power, Apparent power, power factor, Numerical problems. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations for both series and parallel, Numerical problems.

Module 4: Resonance

Resonance in series RLC circuit, Condition for resonance, Band width, Quality factor, Relation between Band width and Q-Factor, simple problems. Resonance in parallel RLC circuits and simple problems.

Module 5: Three Phase AC Circuits

Three-phase balanced circuits, Advantages, voltage and current relations in star and delta connections with phasor diagrams and simple problems. Three-phase Unbalanced circuits, simple problems.

TEXT BOOKS:

1. A Chakrabarty, "Electric Circuits", Dhanipat Rai & Sons, 6th Edition, 2010. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
2. M E Van Valkenberg, "Network Analysis", PHI, 3rd Edition, 2014.

REFERENCE BOOKS:

1. A Sudhakar, Shyammohan S Palli, "Circuits and Networks", Tata McGraw-Hill, 4th Edition, 2010.
2. David A Bell, "Electric circuits", Oxford University Press, 7th Edition, 2009.
3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989

Web Resources:

1. **https://nptel.ac.in/courses/108/104/108104139/**
2. https://nptel.ac.in/courses/117/106/117106108/

Course Outcomes:

- CO1 – To analyze the electrical circuits with DC excitation.
- CO2 – To analyze electrical circuits with the help of network theorems
- CO3 – To analyze electrical circuits with AC excitation
- CO4 – To understand the resonance in electrical circuits.

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low														
Course Outcomes (COs)	**Program Outcomes (POs)**												**Program Specific Outcomes ***	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3			2									
CO2	3	3												
CO3	3	3												
CO4	3	2												

B.Tech I Year–I Sem	L	T	P	C
Subject Code: 22ES1CS01	3	0	4	5

Problem Solving Using C

(Common to CSE/CSM/CDS/CSC/CSO/ECE/EEE/IOT)

Prerequisite: Basic mathematical, analytical and logical capability

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- Enable learners to design, develop and apply logic to solve mathematical and scientific problem.

Course Outcomes:

- Apply the fundamentals of computer and programming language, to draw flow chart, algorithm to solve given program.
- Comprehend the general structure of C program using control structures, functions, recursion to support reusability.
- Apply searching and sorting algorithms for the given list of elements
- Design an application to solve real world problem.

Module I

Introduction to Computer

Van-Neumann Neuann computer architecture, data representation in computer-number systems, types of software, problem techniques-algorithm- properties, constituent of algorithms / different strategies- sequence, selection and repetition, flow chart examples. Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs

Basic Elements of C

Introduction to programming paradigms - Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Keywords – variable, declarations, expressions, symbolic constants, Operators and Expressions Operator precedence and associativity of operators -Input and Output Functions-Library Functions - Header Files - Input/output statements, Assignment statements – Pre-processor directives - Compilation process

Programs:

1. Write an algorithm and draw a flowchart that will read the two sides of a rectangle and calculate its area.
2. Write an algorithm to determine a student's final grade and indicate whether it is passing or failing. The final grade is calculated as the average of four marks.

3. Draw a flowchart to compute the final price of an item after figuring in sales tax.
4. Write a C program to evaluate algebraic expression (ax+b)/(ax-b)
5. 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.
6. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Module II

Selection/Decision Making and Repetition

Decision Making and Branching: simple if, if else, if else ladder, nested if, switch, nested switch-syntax, flowchart and example programs. switch statement – the break statement -? : operator, Decision Making and Looping: while, do-while, for, nested loops-syntax, flowchart and example programs. Unconditional Branching Statements: break, continue and go to-syntax, flowchart and example programs.

Decision Making: if statement - if-else statement - else-if ladder –Looping statements –While –do-while- Still more looping-For statement, Nested control statements- - Continue statement - goto statement.

User Defined Functions

Need for User defined functions, a multifunction program- Elements of user defined functions Definition of Functions- Return values and their Types- Function Calls-Function Declaration Category of functions- Nesting of functions – Built-in functions (string functions, math functions) – Recursion.

Programs:

1. Write a C program to find whether a character is consonant or vowel using switch statement.
2. Write a C program to find the factorial of a given integer using recursive function.
3. Write a program to print the value of f(x) = ax2 + bx + c for a = 1.0, b=2.0 and c = 1.0 for x = 3.0, and 4.0 respectively.
4. Write a program to check whether the binary representation of an integer is palindrome or not.
5. Write a program to check whether a number is Armstrong or not (e.g. 153=13+53+33).
6. Write a program to compute the value of nCm using Recursion where n and m are input by user.

Module III

Arrays and Strings

variable Vs array, types of arrays- one dimensional array -declaration, initialization, accessing elements, example programs, two-dimensional array-declaration. initialization. accessing elements, example programs and multi-dimensional array example programs., Passing Arrays to Functions.

Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Pointers

Address and indirection operators, Pointer type declaration, assignment, initialization – Pointer arithmetic – Functions and pointers – Arrays and pointers -Strings and pointers – Multi-dimensional arrays using pointers – Pointer to arrays – Pointers to functions – Dynamic memory management

Programs:

1. Write a C program to compute sum of the elements stored in an array using pointers and user defined function.
2. Write a C program to perform the basic Matrix operations
   i) Subtraction
   ii) Addition
   iii) Multiplication
   iv) Transpose.
3. Write a C program to count the lines, words and characters in a given text
4. Write a C program to input any string and delete the extra blanks spaces present in the same
5. Write a program to concatenate 2 strings using pointers. Do not use strcat function.
6. Write a program that will read an array of integers. The program should display the elements appearing at even and odd subscript position separately.

Module- IV

Dynamic Memory Management

Dynamic Memory Allocation –Allocating a Block of memory, multiple blocks, releasing used space, altering the size of block.

Structures & Unions

Defining a Structure- initializing structures - Processing a Structure – User defined Data Types – Nested structure - Structures and Pointers - Passing Structures to Functions - Self Referential Structures- Array of structures, Union.

Programs:

1. Write a C program to Display array elements using calloc( ) function
2. Write a C program, by using structure to read and print data of n employees (Name, Employee Id and Salary)
3. Write a C program, which Declare a union containing 5 string variables (Name, House Name, City Name, State and Pin code) each with a length of C_SIZE (user defined constant). Then, read and display the address of a person using a variable of the union.
4. Write a C program to extract individual bytes from an unsigned int using union.
5. Write a C program to calculate the sum of n numbers entered by the user
6. Write a C program to Calculate Total and Percentage marks of a student using structure.

Module V

Data Files

Text and Binary files, Creating and Reading and writing text and binary files, appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

Opening and Closing a Data File - Creating a Data File – Reading & writing a data file. Processing and Updating of Data Files - Unformatted Data Files - Programs using merging, searching of data file contents.

Preprocessor Directives

Commonly used Preprocessor commands like include, define, elif, else, endif, undef, if, ifdef, ifndef

Programs:

1. Write a C program to print every 5th character from current position in a given file.
2. Write a C program to merge two files into a third file
3. Write a C program for #ifdef, #else and #endif
   - "#ifdef" directive checks whether particular macro is defined or not. If it is defined, "If" clause statements are included in source file.
   - Otherwise, "else" clause statements are included in source file for compilation and execution.
4. Write a C program to display the contents of a file to standard output device.
5. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
6. 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.

TEXT BOOKS:

1. Byron S. Gottfried, "Programming with C", Second Edition, Tata McGraw Hill, 2010.
2. Reema Thareja, "Programming in C", Oxford university press, 2nd Edition, 2016.
3. Computer Science: A Structured Programming Approach Using C - B. A. Forouzan and R.F. Giliberg, Third Edition, Cengage Learning'

REFERENCE BOOKS:

1. W. Kernighan Brian, Dennis M. Ritchie, "The C Programming Language", PHI Learning, 2nd Edition, 1988.
2. Yashavant Kanetkar, "Exploring C", BPB Publishers, 2nd Edition, 2003.
3. Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4th Edition, 2014.
4. R. S. Bichkar, "Programming with C", Universities Press, 2nd Edition, 2012.
5. Dey Pradeep, Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford University Press, 2nd Edition, 2006.
6. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.

WEB RESOURCES:

- http://computer.howstuffworks.com/c.htm
- http://www.le.ac.uk/cc/tutorials/c/
- http://www.eskimo.com/~scs/cclass/notes/top.html (for notes)
- http://www.cprogramming.com/tutorial.html
- http://www2.its.strath.ac.uk/courses/c/

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 - Low															
Course Outcomes (COs)	**Program Outcomes (POs)**												**Program Specific Outcomes***		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	2	1	2										2		
CO2	3	1	2										1		
CO3					2								1		
CO4					2								1		

HR22 HITAM/HYDERABAD

B.Tech I Year -I Sem/IISem	L	T	P	C
Course Code: 22BS1EG01 /22BS2EG01	2	0	0	2

English for Skill Enhancement
(Common to CSE/EEE/ECE/CSM/CSD/CSO/CS/ME)

PREREQUISITE(S):

1. Basic knowledge of English language
2. Structure of Sentences/ Sentence formation
3. Basic Grammar rules.
4. Basic Communication Skills

COURSE OBJECTIVES:

1. To improve the language proficiency of students in English with an emphasis on vocabulary, Grammar, Reading and Writing skills.
2. To comprehend the given texts and respond appropriately
3. To integrate their ideas with those of others using summary, paraphrasing, analysis, and synthesis of relevant sources.
4. To develop learning skills and communication skills in formal and informal situations.
5. The students will analyse work(s) of literature in one or more interpretive contexts or frameworks

Module I

Chapter entitled '**Toasted English'** by R.K. Narayan from **"English: Language, Context and Culture**" published by Orient Black Swan, 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.Types of Conjunctions and their usage.

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.

Module 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 –Study the use of graphic elements in texts. Skimming and Scanning – Exercises for Practice
Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

Module III

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

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.
Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Inferring meaning-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.

Module IV

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

Vocabulary: Standard Abbreviations in English
Grammar: Redundancies and Clichés in Oral and Written Communication.
Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice
Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis, Writing

Module 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 Academic Vocabulary 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 and-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.
2. https://www.cambridgeone.org/class/learner/user_clms_8241785/bundle/ic1
3. https://www.cambridge.org/bs/cambridgeenglish/catalog/adult-courses/interchange-5th-edition/components

REFERENCE BOOK

1. *Practical English Usage*, Swan, M. Oxford University Press. 2016
2. Effective Academic Writing by Liss and Davis (OUP)
3. *Communication Skills*. Kumar, S and Lata, P. Oxford University Press. 2018
4. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
5. *Remedial English Grammar*. Wood, F.T. Macmillan. 2007
6. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
7. *On Writing Well* Zinsser, William. Harper Resource Book. 2001
8. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
9. *Study Writing*. Hamp-Lyons, L. Cambridge University Press. 2006
10. Technical Communication. Wiley India Pvt. Ltd. (2019).
11. Vishwa Mohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
12. Swan, Michael. (2016). Practical English Usage. Oxford University Press.

13. Academic Vocabulary in use Fourth Edition “Michael Mecharty”.

E-books:

1. High School English Grammar (issuhub.com)
2.https://www.fluentu.com/blog/english/free-english-ebooks/

Eloquent MOOC Courses:

1. http://nptel.ac.in/courses/109106067/
2. http://nptel.ac.in/courses/109104031/
3. http://www.englishpage.com/listening/
4. https://onlinecourses.swayam2.ac.in/aic21_ge24/preview
5. https://onlinecourses.swayam2.ac.in/nos22_sc61/preview

Course Outcomes:
After undergoing this course, students will be able to:
CO 1: Understand explicit and implicit meaning of a text through known and unknown passages.
CO 2: Demonstrate Language skills in both formal and informal communication.
CO 3: Construct sentences using logical flow of thought and organize ideas.
CO 4: Select appropriate words, phrases & grammatical units and apply them in both
spoken & written communications.

CO-PO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	Program Outcomes (POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1									2	2		
CO2									2	2		
CO3										2		
CO4									3	3		

HR22 **HITAM/HYDERABAD**

B. Tech I Year - I Sem/II Sem	**L**	**T**	**P**	**C**
Course Code: 22BS1EG02/22BS1EG02	**0**	**0**	**2**	**1**

English Language and Communication Skills Lab

(Common to CSE/EEE/ECE/CSM/CSD/CSC/CSO/ME)

Pre-requisite(s):

The knowledge of following concepts is essential to understand the subject

1. Basic knowledge of English language
2. Structure of Sentence / Sentence formation
3. Basic Grammar rules
4. Basic Communication Skills

Course Objectives:

1. To facilitate computer-assisted multimedia 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 speaking in English and neutralize their mother tongue interference.
5. To train students use language appropriately speaking in various activities like role plays, group discussions, interviews and presentation skills etc.

Note: All the given below exercises have to be performed

Exercise – I

CALL Lab:

Understand Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.
Practice: Introduction to 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 ,Word game JAM Session- Situational Dialogues – Greetings – Taking Leave –
Introducing Oneself and Others in formal situations

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 Question tags.
Seeking Permissions - Telephone Etiquette, Telephonic interview.

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 Story telling, poster presentation
Presentation Skills,Progress,Graph Presentation,Topic specific conversations with vocabulary.
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, Debates,critical thinking
Practice: Group Discussion, Debates.

Lab Manuals

1. ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities" by Board of Editors: Hyderabad: Orient Black Swan Pvt. Ltd. 2016. Print.
2. Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. "EMBARK- English for undergraduates" Delhi: Cambridge University Press. 2016. Print.

Suggested Software

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

Reference Books:

1. *Effective Communication Skills: Tips on How to Improve Your Social Skills and Interact with Others Effectively* by Robert Cunningham, Independently Published, 2018
2. *Professional Communication* by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. *English for Technical Communication for Engineering Students*, Ayesha Vishwamohan, Tata Mc Graw-Hill 2009.
4. *English Vocabulary in Use series*, Cambridge University Press 2008.

Course Outcomes:

1. CO1: Acquire vocabulary and use it contextually
2. CO2: Apply listening and speaking skills effectively
3. CO3: Develop proficiency in academic reading and writing
4. CO4: Build up the possibilities of job prospects

CO-PO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1									2	3		
CO2									3	2		
CO3									2	2		
CO4									2	2		

B.Tech I Year – I Sem	**L**	**T**	**P**	**C**
Subject Code: 22PC1EE03	**0**	**0**	**2**	**1**

ELECTRICAL CIRCUIT ANALYSIS -I LAB (EEE)

Pre-requisite: Basic Mathematics, Physics.

Course Objectives:

1. Analyse complex DC and AC linear circuits.
2. Apply concepts of Electrical circuits across engineering.
3. Evaluate response in a given network by using theorems.
4. To study the resonance in electrical circuits.

Note: ALL Experiments are mandatory

1. Verification of ohms law
2. Verification of KVL and KCL
3. Verification of Superposition
4. Verification of Reciprocity Theorem
5. Verification of Thevenin's, Theorem
6. Verification of Norton's Theorem
7. Verification of Maximum power transfer
8. Verification of Milliman's Theorem

Note: Any two experiments should be conducted

9. Resonance in series RLC Circuits
10. Resonance in Parallel RLC Circuits
11. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
12. Study and operation of (i) multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.

Text Books:

1. A Chakrabarthy, "Electric Circuits", Dhanipat Rai & Sons, 6th Edition, 2010. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
2. M E Van Valkenberg, "Network Analysis", PHI, 3rd Edition, 2014.

Reference Books:

1. A Sudhakar, Shyammohan S Palli, "Circuits and Networks", Tata McGraw-Hill, 4th Edition, 2010.
2. David A Bell, "Electric circuits", Oxford University Press, 7th Edition, 2009.
3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989

Course Outcomes:

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

1. Analyse the electrical circuits using network laws.
2. Analyse complex DC and AC Linear circuits.
3. Understand the working of various electrical components.
4. Evaluate response in a given network by using theorems

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	2	3		3								
CO2	2	3		3								
CO3	2	2		3								
CO4	2	2		3								

HR22	**HITAM HYDERABAD**			
B. Tech I Year-I Sem/II Sem	**L**	**T**	**P**	**C**
Subject Code:	**0**	**2**	**0**	**0**
22MC1CHS02/22MC2CHS02				

ENVIRONMENTAL SCIENCE

(Common to CSE/EEE/ECE/MECH/CSM/CSD/CSC/CSO)

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.

2. To educate students about natural resources and their exploitation

3. Understanding the concepts of green chemistry and its applications.

Module I ECOSYSTEMS AND ECOLOGY

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.

Module II NATURAL 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.

Module III BIODIVERSITY AND BIOTIC RESOURCES

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

Module IV ENVIRONMENTAL POLLUTION AND SOLID WASTE

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. Municipal Solid Waste management, composition and characteristics of e- Waste and its management, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions/Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-Gol Initiatives.

Module V GREEN CHEMISTRY & HAZARDOUS CHEMICALS

Introduction & Principles, green solutions for chemical energy storage, green chemistry solutions will be discussed within the fields of Chemical production: choice of feedstock, solvents, catalysts, synthesis routes including microwave and ultrasonic assisted synthesis. Classification of hazardous chemicals, transportation of hazardous chemicals, Hazchem code, Storage and handling of hazardous substances, Emergency preparedness (on site & offsite),

Safety audit, Concept of fire and explosion, Major accidents involving hazardous substances

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.
3. Indu Tucker Sidhwani, Rakesh K. Sharma.

Course Outcomes:

CO-1: Understand the importance of ecosystem and ecological balance in conservation of biodiversity.
CO-2: Understand the concepts of natural resources and its exploitation.
CO-3: Explain the control of pollution for sustainable environment.
CO-4: Explain the concepts green chemistry, its applications.

CO-PO MAPPING:

CO-PO/PSO Mapping Chart(3/2/1 indicates strength of correlation) **3 – High; 2 – Medium; 1 - Low**														
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	3						1							
CO2	3						1							
CO3	3						1							
CO4	3						1							

B. Tech I Year–II Sem	L	T	P	C
Subject Code: 22BS2MT02	3	1	0	4

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(Common to EEE/MECH/ECE/CSE/CSC/CSD/CSM/CSO)

Pre-requisite: Mathematics of 10+2 level

Course Objectives: To provide the student with

1.Methods of solving Ordinary Differential Equations of first & higher order and their applications.
2.Concept of Laplace Transforms, inverse Laplace Transforms and their properties.
3.Solving ordinary differential equations using Laplace transforms techniques.
4.The Physical quantities involved in engineering field related to vector valued function.
5.The basic properties of vector valued functions and their applications to line, surface and volume integrals.

MODULE I

First Order ODE: Geometric interpretation of solutions of first order ODE $\frac{dy}{dx} = f(x, y)$, Exact differential equations, Integrating factors, Linear and Bernoulli's equations.
Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth/decay.

MODULE II

Higher Order Ordinary Differential Equations

Higher order homogeneous and non-homogeneous linear differential equations with constant coefficients. Non-homogeneous terms of the type e^{ax}, $\cos ax$, $sinax$, $x^k, e^{ax}V$ and x^kV.Method of variation of parameters.
Cauchy-Euler's and Legendre's differential equations. Applications: Electrical Circuits (Both first and second order).

MODULE III

Laplace Transforms: Laplace Transform of standard functions; first and second shifting theorems; Laplace transforms of functions when they are multiplied and divided by 't'. Laplace transforms of derivatives and integrals of function; Laplace transforms of Unit step and Impulse functions; Laplace transform of periodic functions.
Inverse Laplace Transforms: Finding inverse Laplace transforms by different methods, convolution theorem (without proof), Solving Ordinary Differential Equations with constant coefficient with given conditions by Laplace Transform method.

MODULE IV

Vector Differentiation: Scalar and vector point functions, Concepts of gradient, divergence and curl of functions in Cartesian framework, Solenoidal fields, irrotational fields, vector identities.

Vector Line Integral: Evaluation of the line integral, concept of work done by a force field, Conservative fields and Potentials.

MODULE V

Surface and Volume Integration: Evaluation of surface and volume integrals, flux across a surface.

Vector Integral Theorems: Green's, Gauss and Stokes theorems (without proofs) and their applications.

TEXT BOOKS:

1.Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 36th Edition, 2010

2. Advanced Engineering Mathematics, R.K. Jain and S.R.K.Iyengar, , Narosa publishing house, Fourth edition 2014.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
2. Engineering Mathematics, Srimanta Pal, Subodh C. Bhunia, Oxford University Press, 2015.
3. Advanced Modern Engineering Mathematics Glyn James, 5th edition, Prentice Hall, 2018.

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

CO1: Solve first, higher order ODE and appreciate their applications in engineering problems.

CO2: Apply Laplace Transforms techniques to solve Ordinary Differential Equations with constant coefficient with given conditions.

CO3: Calculate Divergence, Curl of vector point function and gradient of scalar point function.

CO4: Evaluate Line, Surface and Volume integrals and converting them from one to another.

CO-PO/PSO Mapping Chart
(3/2/1 indicates strength of correlation)
3 – High; 2 – Medium; 1 – Low

Course Outcomes (COs)	Program Outcomes (POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	1										
CO2	3	1										
CO3	3	1										
CO4	3	1										

B.Tech I Year–I/II Sem	L	T	P	C
Subject Code: 22ES1ME01/ 22ES2ME01	0	1	2	2

Engineering Prototyping Lab

(Common to CSE/EEE/ECE/CSM/CSD/CSC/CSO/MECH)

Prerequisites: Practical skill

Course Objectives:

1. To provide the basic knowledge of fundamental tools used by engineers in a manufacturing environment, wiring in electrical circuits, design of electronic components on PCB and knowledge on computer peripherals.
2. To gain a basic working knowledge required for the production of various engineering products.

List of Experiments:

PART A: Mechanical Workshop

Note: Any Seven experiments should be conducted from all Trades

1. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
2. Fitting – (V-Fit, Step Fit , Dovetail Fit & Semi-circular fit)
3. Tin-Smithy – (Open Scoop, Rectangular Tray & Conical Funnel)
4. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
5. Welding Practice – (Arc Welding- Lap or Butt joint)
6. Black Smithy – ('S' hook or Round rod to Ring)
7. House wiring-(One lamp control by using Two 2-way switches (staircase wiring), Wiring of distribution box with MCB, Wiring of three bulbs - Series & parallel connections).

PART B: IT Workshop

Note: Any three experiments should be conducted

1. Draw the block diagram of the PC and peripherals that can be assembled and disassembled.
2. Every student should individually install MS windows/ Linux/Duel Booting on the

personal computer.

3. Installation of Application software in PC (Modelling/Simulation /Automation)
4. Hardware Troubleshooting: Students have to be given a Pthatch 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.
5. 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.
6. Internet & World Wide Web: 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, to the instructor, how to access the websites and email. If there is no internet connectivity preparations.

TEXTBOOKS:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha
3. Experiments in Basic Electrical Engineering by S.K.Bhattacharya , Rastogi- NAI.
4. Industrial Safety management by Deshmukh –TMH

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP
3. Residential and Commercial Industrial Electrical systems Vol.2 by Joshi-TMH
4. Residential and Commercial Industrial Electrical systems Vol.3 by Joshi-TMH
5. Industrial Safety management by Deshmukh –TMH

Web resources:

1. https://www.electricaltechnology.org/2012/11/how-to-control-lamp-by-single-way-or.html

2. https://circuitdigest.com/electronic-circuits/5v-2a-smps-power-supply-circuit-diagram

Course Outcomes:

At the end of the course , students must be able to

1. Fabrication of electrical circuit.
2. Identify and apply suitable tools for different trades of engineering processes.
3. Apply the learnt knowledge for installing operating system, presentations, documentation.
4. Make a prototype by applying domain knowledge.

CO-PO Mapping:

CO-PO Mapping Chart **(3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low**												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	L	L			H							
CO2	H		L									L
CO3	H		L									L
CO4	H			L								

B.Tech I Year–I/II Sem	L	T	P	C
Subject Code: 22ES1ME02/ 22ES2ME02	0	1	2	2

Design Thinking Lab

(Common to Mechanical, EEE, ECE,CSE, CSM,CSO,CSD and CSC)

Pre-requisite:

Course Objectives:

1. Apply domain knowledge to the design of community based projects.
2. Identify and acquire new knowledge as a part of the problem solving / design process.
3. Design products on multidisciplinary concepts and an appreciation for the contributions from individuals from multiple disciplines.
4. Build a role that their discipline can play in social contexts.
5. Provide significant service to the community while learning; gain an understanding of the role that engineering (and their discipline) can play in society.

Module 1:

Problem Identification

Introduction to EPICS, Idea Generation, Brain storming

Societal Survey

Rural area Survey (societal issues), interaction with NGOs, Idea Generation and Group Discussions.

Module 2:

Specification Development

Customer Requirement, Design Constraints, Engineering Specifications

Product Survey

Community Partner allotment, Design Thinking activity

Module 3:

Conceptual Design

Decision matrix, community partner interview, Brainstorming (possible solutions)

Poster Presentation

Documentation & Team wise presentation

Module 4:

Project Specification

Prototype-1 Development, Testing, customer feedback

Project Specification

Prototype-1 presentation, Feedback Report of customer & advisor, Action plan for the next prototype

Module 5:
Detailed Design
Video preparation on conceptual design, Prototype-2 Development, Testing, customer feedback, Presentation

Detailed Design
Make progress on the project and appropriately engage project partners, Complete Design review feedback summary, and Individual and Project documentation

Text Books:
Dahir, M., "Educating Engineers for the Real World", Technology Review, Aug/Sept. 1993, pp. 14-16

Reference Books:
Govindarajan M, Natarajan S, Senthil Kumar V.S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

Web Resources:
https://engineering.purdue.edu/EPICS/Resources/Lectures.
https://unnatbharatabhiyan.gov.in:8443/new-website/
http://www.engineeringchallenges.org/GrandChallengeScholarsProgram.aspx
https://www.ewb-india.org/

Course Outcomes:
1. CO1 – Apply disciplinary knowledge to real and possibly ill-defined problems.
2. CO2 – Collaborate with people from other disciplines and develop an appreciation for multi-disciplinary contributions in design.
3. CO3 – Build the broad set of skills needed to be successful in the changing global workplace and world.
4. CO4 – Acquire knowledge regarding project management.

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 - Low														
Course Outcomes (COs)	**Program Outcomes (POs)**												**Program Specific Outcomes***	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	H	M	M	M		H		M	H	M	M	H	M	M
CO2	H	M	M	M		H		M	H	M	M	H	M	M
CO3	H	M	M	M		H		M	H	M	M	H	M	M
CO4	H	M	M	M		H		M	H	M	M	H	M	M

** If more PSOs are there in a particular branch, required no of columns can be added.*

B.Tech I Year–I/II Sem	L	T	P	C
Subject Code: 22ES1ME03/ 22ES2ME03	**2**	**0**	**2**	**3**

Computer-Aided Engineering Graphics
(Common to Mechanical, EEE, ECE,CSE, CSM,CSO,CSD and CSC)

Pre-requisite: Basic Geometry and maths.

Course Objectives:

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects
3. To draw sectional views and pictorial views of solids.
4. To know development of different types of surfaces.
5. To draw Isometric to Orthographic Projections and Vice-versa.

Module I

Introduction to Engineering Graphics and CAD:
Drawing Instruments and their uses, types of lines, Lettering, Rules of dimensioning. Construction of polygons - practice only. Conic Sections: Ellipse, Parabola, Hyperbola including the Rectangular Hyperbola - General method only.

Cycloid, Epicycloid, and Hypocycloid, Scales – Construction of Plain & Diagonal scales. Introduction to CAD software packages commands.

Module II
Orthographic Projections of Points and Lines:
Orthographic Projection of points: Projection of points placed in different quadrants, Orthographic Projection of straight lines inclined to one and two reference planes placed in the first quadrant only.

Module III
Orthographic Projections of Planes and Solids:
Projections of Planes inclined to one and two reference planes placed in the first quadrant only.

Projections of Solids: Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes. Computer aided projections of solids.

Module IV

Sections of Solids and Development of Lateral Surfaces

Introduction to Auxiliary views, Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone .

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone. Development of surfaces using computer aided drafting

Module V

Isometric Projections/views:
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. Conversion of orthographic views to Isometric views using computer aided drafting.
Transformation of Projections:
Conversion of Isometric views to orthographic views.
.

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

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

REFERENCE BOOKS:
1. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw 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 Vela Murali, Oxford
5. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

Equivalent Mooc Courses :

1. **https://nptel.ac.in/courses/112/104/112104172/**
2. https://nptel.ac.in/courses/112/103/112103019/
3. **https://www.classcentral.com/course/swayam-engineering-graphics-5305**

4. **https://www.greatlearning.in/academy/learn-for-free/courses/engineering-graphics-drawing**
5. **https://www.classcentral.com/course/swayam-engineering-architectural-graphics-part-i-orthographic-projection-22964**

Course Outcomes:

At the end of the course student able to

1. CO1 – Identify the suitable scale and Construct engineering curves using CAD.
2. CO2 – Demonstrate the orthographic projections of all planes and Solids.
3. CO3 – Illustrate the position of the sectional planes for given sections of solids using CAD.
4. CO4 – Convert the isometric to orthographic projections and orthographic to isometric projections of solids.

CO-PO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 - Low												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	H	M										
CO2	H	M										
CO3	H	M										
CO4	H	M										

B.Tech I Year – II Sem	**L**	**T**	**P**	**C**
Subject Code: 22PC2EE02	**3**	**0**	**0**	**3**

Power Systems-I

Pre-requisite: Basic Electrical Engineering, Electrical Machines-I, Electrical Machines-II.

Course Objectives:

1. To understand the different types of power generating stations.
2. To illustrate the economic aspects of power generation and tariff methods.
3. To evaluate the transmission line parameters calculations
4. To examine A.C. and D.C. distribution systems.
5. To analyse the performance of transmission lines.

Module I: Conventional Power Plants

Conventional Sources (Qualitative): Hydro Power station, water turbines, Steam Power Plant, types of boilers, types of Super heaters, economisers, Air preheater Nuclear Power Plant, Nuclear energy, fission and fusion reactions, Nuclear reactors, control rods, Heat exchanger.

Module II: Non-Conventional Power Plants

Wave energy, Solar radiation, Principle of Conversion of solar radiation into heat Function of flat plate collector, Working principle of Solar air heater, methods of storing solar energy, Principle of photo voltaic conversion, Applications Solar photo voltaic arrays, Working principle of solar cell, VI Characteristics of Solar cell, Power available in wind, Wind data energy estimation, Site selection for installing Wind mill basic components, constructional details and working principle of wind mill, Cogeneration and energy conservation and Storage.

Module III: Economics of Generation

Introduction, definitions of connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants, Cost of electrical energy-fixed cost, running cost, Tariff on charge to customer.

Module IV: **A.C Distribution systems:** A.C. Distribution: Introduction, AC distribution, Single phase, 3-phase, 3 phase 4 wire system, bus bar arrangement, Selection of site for substation. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

Module V: **D.C Distribution systems**

DC Distribution: Classification of Distribution Systems.- Comparison of DC vs AC and Under-Ground vs. Over- Head Distribution Systems.- Requirements and Design features of Distribution Systems.- Voltage Drop Calculations (Numerical Problems) in D.C Distributors

for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

Text Books:

1. W.D.Stevenson –Elements of Power System Analysis, Fourth Edition, McGraw Hill, 1984.
2. C.L. Wadhwa –Generation, Distribution and Utilization of Electrical Energy, Second Edition, New Age International, 2009.

Reference Books:

1. C.L. Wadhwa –Electrical Power Systems, Fifth Edition, New Age International, 2009
2. D.P. Kothari and I. J. Nagrath, Modern Power System Analysis - Tata Mc Graw Hill Pub. Co., New Delhi, Fourth edition, 2011
3. HadiScadat: Power System Analysis – Tata Mc Graw Hill Pub. Co. 2002
4. Third "V.K Mehta and Rohit Mehta", "Principles of Power Systems", S. Chand & Company Ltd, New Delhi, 2004.

E books:

1. http://www.webprosindia.com/hitam/resources/ELECTRICAL%20POWER%20SYSTEMS%20BY%20D.DAS_913.pdf

Equivalent MOOC Courses if any:

1. https://www.coursera.org/learn/electric-power-systems
2. https://www.coursera.org/learn/renewable-power-electricity-systems

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

1. CO1 – Understand the concepts of power systems.
2. CO2 – Understand the operation of conventional generating stations and renewable sources of electrical power.
3. CO3 –Evaluate the power tariff methods.
4. CO4 – Analyse different types of distribution systems

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low														
Course Outcomes (COs)	**Program Outcomes (POs)**												**Program Specific Outcomes ***	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	1		1									1	1
CO2	1			1									1	1
CO3	1	1		1									1	1
CO4	1	1		1									1	1

B. Tech I Year – II Sem	L	T	P	C
Subject Code: 22ES3CS03	2	0	2	3

Problem Solving Using Python

(EEE)

Course Objectives:

- To learn about Python programming language syntax, semantics, and the runtime environment
- To be familiarized with universal computer programming concepts like data types, containers
- To be familiarized with general computer programming concepts like conditional execution, loops & functions
- To be familiarized with general coding techniques and object-oriented programming

Course Outcomes:

- **Develop** essential programming skills in computer programming concepts like data types, containers.
- **Solve** coding tasks related to conditions, loops and String, List, Tuple, Dictionary and Set.
- **Apply** the Function, Modules for coding
- **Implement** Files and object oriented principles in Python.

Module I

Introduction: Introduction to Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations, Operators. Type conversions, Expressions, More about Data Output.

Data Types, and Expression: Strings Assignment, and Comment, Numeric Data Types and Character Sets, Using functions and Modules.

Module II

Decision Structures and Boolean Logic:

if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Control Statement:

Definite iteration for Loop Formatting Text for output, Selection if and if else Statement Conditional Iteration, While Loop

Module III

Strings and Text Files: Accessing Character and Substring in Strings, Data Encryption, Strings and Number Systems, String Methods Text Files.

Sequences - String, List, Tuple, Dictionary and Set**.**

Module IV

Design with Function: Functions as Abstraction Mechanisms, Problem Solving with Top Down Design, Design with Recursive Functions, Case Study Gathering Information from a File System, Managing a Program's Namespace, Higher Order Function.

Modules: Modules, Standard Modules, Packages

File Operations: Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek, Programming using file operations

Module V

Object Oriented Programming: Concept of class, object and instances, Constructor, class attributes and destructors, Real time use of class in live projects, Inheritance , overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support

Design with Classes: Objects and Classes, Data modeling Examples, Case Study An ATM, Structuring Classes with Inheritance and Polymorphism

TEXT BOOKS:

1. Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage.
2. Reema Thareja, "Python Programming - Using Problem Solving Approach", Oxford Press, 1st Edition, 2017.
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.

REFERENCES:

1. Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press.
2. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

CO-PO-PSO MAPPING

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSPO1**	**PSPO2**
CO-1		2	2										2	2
CO-2	1	2	2										2	2
CO-3	1	3	2										2	1
CO-4		2	2	2									2	1
CO-5		2	2										2	1

B.Tech I Year – II Sem	**L**	**T**	**P**	**C**
Subject Code: 22PC2EE04	**3**	**0**	**0**	**3**

Electrical Machines-I

Pre-requisite: Basic Electrical Engineering

Course Objectives:

1. To study and understand different types of DC generators, Motors and Transformers, their construction, operation and applications.
2. To analyze performance aspects of various testing methods.

Module I: Electro-Mechanical energy conversion & D.C. Generators

Electro mechanical Energy conversion, Energy and force in singly excited system, Energy and co-energy. Principle of operation, constructional features, armature windings – lap and wave windings, EMF Equation, Separately excited and self-excited generators, critical field resistance and critical speed.

Module II: Armature Reaction & Characteristics

Armature reaction and their effects, commutation, methods of improving commutation. Load Characteristics of shunt, series and compound generators.

Module III: D.C Motors

Principle of operation, Significance of Back E.M.F, Torque equation, characteristics of shunt, series and compound motors, Losses, calculation of efficiency and condition for maximum efficiency, 3-point and 4-point starters, Speed control of DC Motors
Armature voltage and field flux control methods,

Testing of DC Machines: Brake test, Separation of stray losses in a DC Motor and Hopkinson's test

Module IV: Single Phase Transformers Principle of operation of single phase Transformer, constructional details, EMF equation, Operation of Transformer on no-load and load condition - phasor diagrams, Losses, efficiency, regulation and Equivalent circuit, All day efficiency. Auto transformer, Comparison with two winding transformers.

Module V: Testing of Transformers

Parallel operation with equal and unequal voltage ratios, OC and SC tests, Sumpner's test, separation of losses test, Poly-phase transformers – Poly-phase connections - Y/Y, Y/Δ, Δ /Y, Δ / Δ and open Δ.

Text Books:

1. "Electric Machinery", 11.A. E. Fitzgerald and C. Kingsley, New York, McGraw Hill Education, 2013.
2. "Performance and design of DC machines", 2. A. E. Clayton and N. N. Hancock, CBS Publishers, 2004.
3. "Electrical Technology" B.L. Thereja and A.K. Thereja, ,S.Chand Publishers, 2004.

Reference Books:

1. "Performance and design of AC machines" M. G. Say, , CBS Publishers, 2002.
2. "Electrical Machinery", P. S. Bimbhra, Khanna Publishers, 2011.
3. "Electric Machines", I. J. Nagrath and D. P. Kothari, McGraw Hill Education, 2010.

Equivalent MOOC Courses if any:

1. https://nptel.ac.in/courses/108/105/108105155/
2. https://nptel.ac.in/courses/108/105/108105131/

E-Books:

https://1lib.in/book/672020/d9fa45

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. CO1 – Explain different parts of a DC machine & understand its operation
2. CO2 – Analyze different testing methods to predetermine the efficiency of DC machines
3. CO3 – Describe different excitation and starting methods of DC machines and Control the voltage and speed of a DC machines
4. CO4 – Analyze single phase and three phase transformers circuits

CO-PO/PSO Mapping Chart
(3/2/1 indicates strength of correlation)
3 – High; 2 – Medium; 1 – Low

Course Outcomes (COs)	Program Outcomes (POs)												Program Specific Outcomes*	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2													
CO2	3													
CO3	2	2											1	
CO4	2	2												

AY 2022-23 onwards	Hyderabad Institute of Technology and Management (UGC Autonomous)	B.Tech I Year – I/II Sem		
Course Code: 22MC1HS01/22MC2HS01	Social and Health Consciousness (Common to (ECE,EEE,ME,CSE,CSD,CSO,CSC,CSM)	L	T	P
Credits: 0		1	0	0

Course Objectives:

1. To promote positive health, prevention of stress related to health problems and rehabilitation through Yoga.
2. To impart skills in the students to introduce Yoga for health to general public
3. To invoke scientific attitude and team spirit to channelize their energies in to creative and constructive endeavours.
4. The main objective of National Service Scheme is personality development through social service or community service and through physical education.

Module I

Unit 1:Introduction to Yoga and Importance of Yogic practices

Definition, nature and scope of yoga-Elements of Yoga in Vedic and Upanashadic literature. -Development of yoga through the ages. - Schools of yoga: Karma Yoga, Bhakti Yoga, Jnana Yoga, Hatha yoga, Raja yoga and Mantra Yoga.General benefits of Yoga Practices, preparing oneself for yoga practices, Comparison between yoga practices and other systems of physical exercises though practical examples.

Unit 2: Concept of Yoga Practices and its Types

Types of Yoga -Hatha Yoga, Raja Yoga, Laya Yoga, Bhakti Yoga, Gyan Yoga, Karma Yoga,Asthang Yoga, Relevance of Yoga in modern life. Yama and Niyama (Attitude Training Practices), Asana (Steady Postures), Pranayama (control of the breathing process), Mudras and Bandhas (seal and lock for energy), Shat Kriya (six purification techniques), Dhyana (Meditation)

Module II

Unit 3:Asana

Definition, Scope and limitations of Asana, Classification of Asanas and different types of Asanas relating to posture**,** Role of asana in yogic spiritual Yogic culture and Physical culture, different stage and phases in the performing of asana, Comparison between Asanas and other systems of physical exercises through practical examples**.**

Unit 4:Pranayama

Definition, Different phases of Pranayama, Importance of Pranayama in Yogic Curriculum, Comparison between pranayama & deep breathing exercises with practical examples.

Module III

Unit 5: Introduction to the physical education and ethics in sports

Meaning&DefinitionsofEducation- Aim&ObjectivesofEducation-ImportanceofEducationintheModern Era-Meaning&DefinitionsofPhysicalEducation.

Values- Importance, Sources of Value System, Types, Loyalty. Ethics in Sports– Nature, Characteristics and Needs, Ethical practices in the field of Sports, Sports Code of Conduct. Sports As a Profession– Organization demand, Individual needs and professional ideal.

Unit 6:Olympic,CommonwealthandAsianGames

Ancient Olympic Games –Historical Background, Significance ofAncientGames. -ModernOlympicGames:OlympicMotto,Emblem,Rings,InternationalOlympicCommittee(IOC),functionsofIOC - AsianGames

Module 4

Unit 7: Philosophy of National Service Scheme (NSS)

Introduction and Basic Concepts of NSS, History and Philosophy & Definition of NSS, Aims & Objectives of NSS, Emblem, flag, Motto, Song, Badge, NSS day etc., Organizational structure (from national to regional level), Roles and responsibilities of various NSS functionaries

Unit 8: NSS Programmes and Activities

NSS Programmes and Activities, Concept of regular activities (one day camp), special seven-day conduction camping, day and night camps and relevance of celebration of important days recognized by united nations, Centre, State Govt. & University, Basis of adoption of village/slums, methodology of conduction survey, financial pattern of the scheme, Coordination with different agencies, Maintenance of the diary

Module 5

Unit 9:Community Mobilization

Functioning of community stakeholders, Designing the message in the context of the problem and the culture of the community, Identifying methods of mobilization, Youth-Adult partnership, Concept of Community development

Unit 10:Volunteerism and Government Organisations /Non-Government Organisations

Indian tradition of volunteerism, Value system of volunteerism, Motivation and constraints of volunteerism, Role of NSS volunteers in Swatch Bharat Abhiyan, Role of NSS volunteers in Digital India, Sources of funding National Service Scheme (NSS)-Government organisations (GO) and Non-Government organisations (NGO).

Text Books:

1. The Heart of Yoga: Developing a Personal Practiceby T.K.V. Desikachar
2. The Yoga Sutras by Satchidananda
3. Freeman–PhysicalEducationinChangingSociety
4. SinghAjmer,et.al.ModernTextBookofPhysicalEducationHealth&Sports,KalyaniPublisher.
5. National Service Scheme: A Youth Volunteers Programme for Under Graduate Students as Per UGC Guidelines 2nd Semester (PB),1 January 2020, by Amit Kumar Jain & Brijesh Kumar Rat Panwar, J D S

Reference Books:

1. Yoga The Spirit and Practice of Moving into Stillness by Erich Schiffmann
2. Yoga Anatomy by Leslie Kaminoff
3. Essentials of Physical Education" By Ajmer Singh & Jagdish

Web Resources:

1. https://www.yogapoint.com/info/basicmovement.htm
2. https://www.thecut.com/article/best-free-yoga-classes-online.html
3. https://www.futurelearn.com/courses/outstanding-physical-education
4. https://www.udemy.com/course/community_service_engineering

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

1. CO1:Enable the student to have good health and mental hygiene.
2. CO2:Possess emotional stability to integrate moral values through social service.
3. CO3:Attain higher level of consciousness in both physical and mental status.
4. CO4:Understand the concept of ill health and their remedies through yoga.

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	**Program Outcomes (POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1						2		2				3
CO2						3		2				3
CO3						2		2				3
CO4						2		2				3