HYDERABAD KARNATAKA EDUCATION SOCIETY'S
PDA COLLEGE OF ENGINEERING, KALABURAGI
2022-23
FIRST-YEAR SYLLABUS

Sl.No	Sub Code	CONTENTS	P.No
1	**Scheme I Semester (CCT Engineering Stream) Chemistry Group**		5
2	22MATC11	Mathematics for Civil Engg Stream-I	6
3	22CHEC12	Chemistry for Civil Engg Stream	8
4	22CED13	Computer-Aided Engineering Drawing	10
5	22ESC145	Introduction to C Programming	11
6	22ETC15X	**Emerging Technology Courses**	175-185
7	22ENG16	Communicative English	13
8	22ICO17/27	Indian Constitution	14
9	22SFH18	Scientific Foundations of Health	15
10	**Scheme II Semester (CCT Engineering Stream) Physics group**		5
11	22MATC21	Mathematics for Civil Engg stream-II	16
12	22PHYC22	Physics for Civil Engg Stream	18
13	22CIV23	Engineering Mechanics	20
14	22ESC244	Introduction To Mechanical Engineering	22
15	22PLC25X	Programming Language Courses-I&II	186-194
16	22PWS26	Professional Writing Skills in English	24
17	22KSK17/27- 22KBK17/27	Samskrutika Kannada/ Balake Kannada	25/27
18	22IDT28	Innovation and Design Thinking	29
19	**I Semester (Civil Engineering Stream) (Chemistry Group)**		30
20	22MATC11	Mathematics for Civil Engg Stream-I	31
21	22CHEC12	Chemistry for Civil Engg Stream	33
22	22CED13	Computer-Aided Engineering Drawing	35
23	22ESC145	Introduction to C Programming	36
24	22ETC15X	**Emerging Technology Courses**	175-185
25	22ENG16	Communicative English	38
26	22ICO17/27	Indian Constitution	39
27	22SFH18	Scientific Foundations of Health	40
28	**II Semester (Civil Engineering Stream) (Physics Group)**		30
29	22MATC21	Mathematics for Civil Engg stream-II	41
30	22PHYC22	Physics for Civil Engg Stream	43
31	22CIV23	Engineering Mechanics	45
32	22ESC242	Introduction To Electrical Engineering	46
33	22PLC25X	Programming Language Courses-I&II	186-194
34	22PWS26	Professional Writing Skills in English	47
35	22KSK17/27- 22KBK17/27	Samskrutika Kannada/ Balake Kannada	48/50
36	22IDT28	Innovation and Design Thinking	52
37	**I Semester (CSE Stream)(CSE/CSD/ISD/AIML Branches)(Physics Group)**		53
38	22MATS11	Mathematics for CSE Stream-I	54
39	22PHYS12	Physics for CSE stream	56
40	22POP13	Principles of Programming Using C	58
41	22ESC143	Introduction to Electronics Engineering	59

42	22ETC15X	**Emerging Technology Courses**	175-185
43	22ENG16	Communicative English	60
44	22KSK17/27- 22KBK17/27	Samskrutika Kannada/ Balake Kannada	61/63
45	22IDT18	Innovation and Design Thinking	65
46	**II Semester (CSE Stream) (CSE/CSD/ISE/AIML Branches)(Chemistry Group)**		53
47	22MATS21	Mathematics for CSE Stream -II	66
48	22CHES22	Chemistry for CSE Stream	68
49	22CED23	Computer-Aided Engineering Drawing	70
50	22ESC242	Introduction to Electrical Engineering	71
51	2PLC25X	Programming Language Courses-I&II	186-194
52	22PWS26	Professional Writing Skills in English	72
53	22ICO17/27	Indian Constitution	73
54	22SFH28	Scientific Foundations of Health	74
55	**I Semester (Electronics and Communication Engineering & EIE) (Chemistry Group)**		75
56	22MATE11	Mathematics for EEE Stream-I	76
57	22CHEE12	Chemistry for EEE Stream	78
58	22CED13	Computer-Aided Engineering Drawing	80
59	22ESC145	Introduction to C Programming	81
60	22ETC15X	**Emerging Technology Courses**	175-185
61	22ENG16	Communicative English	83
62	22ICO17/27	Indian Constitution	84
63	22SFH18	Scientific Foundations of Health	85
64	**II Semester (Electronics and Communication Engineering& EIE) (Physics Group)**		75
65	22MATE21	Mathematics for EEE stream-II	86
66	22PHYE22	Physics for EEE Stream	89
67	22BEE13	Introduction to Electronics engineering	91
68	22ESC244	Introduction to Mechanical Engineering	92
69	22PLC25X	Programming Language Courses-I&II	186-194
70	22PWS26	Professional Writing Skills in English	94
71	22KSK17/27- 22KBK17/27	Samskrutika Kannada/ Balake Kannada	95/97
72	22IDT28	Innovation and Design Thinking	99
73	**I Semester (EEE Engineering Stream) (Chemistry Group)**		100
74	22MATE11	Mathematics for EEE Stream-I	101
75	22CHEE12	Chemistry for EEE Stream	103
76	22CED13	Computer-Aided Engineering Drawing	105
77	22ESC145	Introduction to C Programming	106
78	22ETC15X	**Emerging Technology Courses**	175-185
79	22ENG16	Communicative English	108
80	22ICO17/27	Indian Constitution	109
81	22SFH18	Scientific Foundations of Health	110
82	**II Semester (EEE Stream) (Physics Group)**		100
83	22MATC21	Mathematics for EEE stream-II	111
84	22PHYE22	Physics for EEE Stream	**114**
85	22EEE23	Elements of electrical engineering	116
86	22ESC243	Introduction to Electronic Engineering	118
87	22PLC25X	Programming Language Courses-I&II	186-194

88	22PWS26	Professional Writing Skills in English	119
89	22KSK17/27- 22KBK17/27	Samskrutika Kannada/ Balake Kannada	120/122
90	22IDT28	Innovation and Design Thinking	124
91	**I Semester IPE Stream) IPE**	**(Physics Group)**	125
92	22MATM11	Mathematics for ME Stream-I	126
93	22PHYM12	Physics for ME Stream	127
94	22EME13	Elements of mechanical engineering	131
95	22ESC145	Introduction to C Programming	132
96	22ETC15X	**Emerging Technology Courses**	175-185
97	22ENG16	Communicative English	134
98	22KSK17-22KBK17	Samskrutika Kannada/ Balake Kannada	135/137
99	22IDT18	Innovation and Design Thinking	139
100	**II Semester (IPE Stream)**	**(Chemistry Group)**	125
101	22MATM21	Mathematics for ME stream-II	140
102	22CHEM22	Chemistry for Civil Engg Stream	142
103	22CED23	Computer-Aided Engineering Drawing	145
104	22ESC242	Introduction to Electrical Engineering	146
105	22PLC25X	Programming Language Courses-I&II	186-194
106	22PWS26	Professional Writing Skills in English	147
107	22ICO/27	Indian Constitution	148
108	22SFH28	Scientific Foundations of Health	149
109	**I Semester (Mechanical Engineering Stream) Mech, /EE**	**(Physics Group)**	150
110	22MATM11	Mathematics for ME Stream-I	151
111	22PHYM12	Physics for ME Stream	153
112	22EME13	Elements of Mechanical Engineering	156
113	22ESC145	Introduction to C Programming	157
114	22ETC15X	**Emerging Technology Courses**	175-185
115	22ENG16	Communicative English	159
116	22KSK17/ 22KBK17	Samskrutika Kannada/ Balake Kannada	160/161
117	22IDT18	Innovation and Design Thinking	163
118	**II Semester (Mechanical Engineering Stream) Mech, /EE**	**(Chemistry Group)**	150
119	22MATM21	Mathematics for ME stream-II	164
120	22CHEM22	Chemistry for ME Stream	166
121	22CED23	Computer Aided Engineering Drawing	168
122	22ESC241	Introduction to Civil Engineering	169
123	22PLC25X	Programming Language courses I & II	186-194
124	22PWS26	Professional writing skills in iEnglish	170
125	22ICO27	Indian Constitution	171
126	22SFH28	Scientific Foundations of Health	172
		(ESC-I) Engineering Science Courses-I&II	
127	22ESC141/241	Introduction to Civil Engineering	173
128	22ESC142/242	Introduction to Electrical Engineering	174
129	22ESC143/243	Introduction to Electronics Engineering	175
130	22ESC144/244	Introduction to Mechanical Engineering	176
131	22ESC145/245	Introduction to C Programming	177
		(ETC-I) Emerging Technology Courses-I&II	

132	22ETC15A/25A	Green Buildings	179
133	22ETC15B/25B	Introduction to solar PV systems	180
134	22ETC15C/25C	Renewable Energy Sources	182
135	22ETC15D/25D	Introduction to Internet of Things (IOT)	183
136	22ETC15E/25E	Introduction to Cyber Security	184
137	22ETC15F/25F	WASTE MANAGEMENT	185
		(PLC-I) Programming Language Courses-I&II	
138	22PLC15A/25A	Introduction to Web Programming	186
139	22PLC15B/25B	Introduction to Python Programming	188
140	22PLC15C/25C	Basics of JAVA programming	190
141	22PLC15D/25D	Introduction to C++ Programming	192
142	22PLC15E/25E	C and UNIX programming	194

P.D.A College of Engineering alaburagi (Autonomous Institution)
Scheme of Teaching and Examinations-2022
Outcome-Based Education (OBE)and Choice Based Credit System (CBCS) (Effective from the academic year 2022-23)

I Semester (CCT Engineering Stream) (Chemistry Group)

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				
					Theory Lectur	Tutorial	Practical/	SDA	Duration in hours	CIEMarks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATC11	Mathematics for Civil Engg Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHEC12	Chemistry for Civil Engg Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED13	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC145	Introduction to C Programming	Respective EnggDept	2	0	2	0	03	50	50	100	03
5	ETC-I	22ETC15A	Emerging Technology Courses		3	0	0	0	03	50	50	100	03
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMS	22ICO17/27	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	22SFH18	Scientific Foundations of Health	AnyDept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

P.D.A College of Engineering Kalburagi (Autonomous Institution)
Scheme of Teaching and Examinations-2022
Outcome-Based Education(OBE)and Choice Based Credit System(CBCS) (Effective from the academic year 2022-23)

II Semester (CCT Engineering Stream) (Physics Group)

Sl. No	Course and CourseCode		CourseTitle	TD/PSB	Teaching Hours/Week				Examination				
					Theory Lectu	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	credits
					L	T	P	S					
1	ASC(IC)	22MATC21	Mathematics for Civil Engg stream-II	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYC22	Physics for Civil Engg Stream	PHY	2	2	2	0	03	50	50	100	04
3	ESC	22CIV23	Engineering Mechanics	Civil ng Dept	2	2	0	0	03	50	50	100	03
4	ESC-I	22ESC244	Introduction To Mechanical Engineering	Respective Engg dept	3	0	0	0	03	50	50	100	03
5.	PLC-I	22PLC25X	Programming Language Courses-I&II	Any dept	2	0	2	0	03	50	50	100	03
6	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada/ Balak Kannada	Humanities	1	0	0	0	1.5	50	50	100	01
8	AEC/SDC	22IDT28	Innovation and Design Thinking	Any Dept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

Course Title: **Mathematics-I for Civil Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	22MATC11	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory +10 Lab slots	Exam Hours	03

Module-1 Calculus (5L+3T)

Introduction to polar coordinates and curvature relating to Civil engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, and angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems.

Self-study: Center and circle of curvature, evolutes and involutes.

Applications: Applied Mechanics, Structural design and paths, Strength of materials, Elasticity.

(RBT Levels: L1, L2 and L3)

Module-2 Series Expansion and Multivariable Calculus (6L+3T)

Introduction to series expansion and partial differentiation in the field of Civil engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms – L'Hospital's rule, problems.

Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables – Simple Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

Applications: Computation of stress and strain, Errors and approximations, Estimating the critical points and extreme values **(RBT Levels: L1, L2 and L3)**

Module-3 Ordinary Differential Equations (ODEs) of first order (6L+2T)

Introduction to first-order ordinary differential equations pertaining to the applications for Civil engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on $\frac{1}{\mathrm{N}}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{\mathrm{M}}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$

Orthogonal trajectories and Newton's law of cooling.

Nonlinear differential equations: Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations - Problems**.**

Self-Study: Applications of ODE's in Civil Engineering problems like bending of the beam, whirling of shaft, solution of non-linear ODE by the method of solvable for x and y.

Applications: Rate of Growth or Decay, Conduction of heat.

(RBT Levels: L1, L2 and L3)

Module-4 Integral Calculus (6L+3T)

Introduction to Integral Calculus in Civil Engineering applications.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions. Problems.

Self-Study: Volume by triple integration, Center of gravity.

Applications: Applications to mathematical quantities (Area, Surface area, Volume), Analysis of probabilistic models.**(RBT Levels: L1, L2 and L3)**

Module-5 Linear Algebra (5L+3T)

Introduction of linear algebra related to Civil Engineering applications.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector.

Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications: Structural Analysis, Balancing equations.**(RBT Levels: L1, L2 and L3)**

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigenvectors and find the largest and smallest eigen value by Rayleigh power method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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

CO 1	Apply the knowledge of calculus to solve problems related to polar curves
CO 2	Learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 3	Analyze the solution of linear and nonlinear ordinary differential equations
CO 4	Apply the knowledge of multiple integrals to compute area and volume.
CO 5	Make use of matrix theory for solving for system of linear equations and compute eigen values and eigen vectors. Familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB

Course Title:	Chemistry for Civil Engineeringstream		
Course Code:	22CHEC12/22	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)[1]	2:2:2:0	ExamHours	03+02
Total Hours of Pedagogy	40 hours Theory +10 to 12 Lab slots	Credits	04

Module-1: Structural Materials (8 hr)

Metals and Alloys: Introduction, Properties and application of Iron and its alloys, Aluminium and its alloys.
Cement: Introduction, composition, properties, classification, manufacturing process of cement, process of setting and hardening of cement, additives for cement and testing of cement.
Refractories: Introduction, classification based on chemical composition, properties and application of refractory materials.
Glass: Introduction, Composition, Types, Preparation of Soda-lime glass, properties and applications of glass.
Self-learning: Chemistry of reinforced concrete from various sources of water (seawater, groundwater, treated water).

Module-2: Energy Conversion and Storage, Corrosion (8 hr)

Energy conversion: Introduction, construction, working, and applications of Na-ion cell, methanol-oxygen fuel cell.
Storage devices: Introduction, construction and working of Li-ion battery.
Corrosion: Introduction, mechanism of electrochemical corrosion with iron as an example, types (differential metal and aeration), Stress corrosion, corrosion control galvanization, anodization and sacrificial anode method. Factors affecting corrosion (EMF, Temperature, pH, relative area of anode and cathode and polarization).
Self-learning: Corrosion inhibitors.

Module-3: Water Technology and Nanotechnology (8 hr)

Water technology: Introduction, sources and nature of impurities of water, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by Lime-Soda Process, determination of COD, numerical problems. Purification of water by Reverse osmosis and chlorination methods.
Nanotechnology: Introduction, properties and engineering application of carbon nanotubes, graphene and nanomaterials for water treatment(metal oxide)
Self-learning: Introduction, classification, properties and application of silicon carbide.

Module-4:Polymer and Composites (8 hr)

Polymers: Introduction, types of polymerization, free radical mechanism of addition polymerization, techniques of addition polymerization, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC) and polystyrene.
Conducting polymers – synthesis and conducting mechanism of Polyacetylene
Fibers: Introduction, synthesis, properties and industrial applications of Kevlar and Polyester.
Plastics: Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon.
Adhesives: Introduction, synthesis, properties and application of epoxy resin.
Polymer Composite: Introduction, properties and applications of fibre reinforced polymer composites.
Self-learning: Biopolymer: Introduction, structural properties, and applications ofcellulose and lignin, synthesis of polylactic acid and their application.

Module-5:Phase Rule and Analytical Techniques (8 hr)

Phase rule: Introduction, Definition of terms: phase, components, degree of freedom, phase rule equation. Phase diagram: Two component-lead-silver system.
Analytical techniques: Introduction, principle, instrumentation of potentiometric sensors; its application in the estimation of iron, Optical sensors (colorimetry); its application in the estimation of the copper, pH-sensor (Glass electrode); its application in the determinationof pH of beverages.
Self-learning: Determination of viscosity of biofuel and its correlation with temperature.

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:

A1. Synthesis of polyurethane
A2. Quantitative estimation of Aluminium by precipitation methodA3. Synthesis of iron oxide nanoparticles
A4. Determination of chloride content in the given water sample by Argentometric method

B – Exercise (compulsorily any 4 to be conducted):

B1.Conductometric estimation of acid mixture
B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$

B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss methodB5.Estimation of total hardness of water by EDTA method

C – Structured Enquiry (compulsorily any 4 to be conducted):

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)
C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method C4. Estimation of Sodium present in soil/effluent sample using flame photometry
C5. Determination of Chemical Oxygen Demand(COD) of industrial waste water sample

D – Open Ended Experiments (any two):

D1. Gravimetric estimation of gypsum in Portland cementD2. Electroplating of desired metal on substrate
D3. Estimation of manganese dioxide in pyrolusite
D4. Analysis of cement for its components

Course Title:	**COMPUTER AIDED ENGINEERING DRAWING**		
Course Code	**22CED13/23**	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

Module-1

Introduction: ***for CIE only***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

Application on projections of Lines & Planes (For CIE only)

Module-2

Orthographic Projection of Solids:

Orthographic projection of right regular solids (**Solids Resting on HP only**): Prisms & Pyramids (square, pentagon, hexagon), Cylinders, Cones, Cubes .

Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).

Module-3

Isometric Projections:

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones andspheres. Isometric projection of combination of two simple solids.

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components.

Introduction to drawing views using 3D environment (For CIE only).

Module-4

Development of Lateral Surfaces of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Module-5

Multidisciplinary Applications & Practice ***(For CIE Only):***

Free hand Sketching; True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts todimensions etc

Electric Wiring and lighting diagrams; Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

Basic Building Drawing; Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges,trusses using Auto CAD or suitable software,

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts: Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or anysuitable software.

Course Outcomes

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

CO 1. Draw and communicate the objects with definite shape and dimensions

CO 2. Recognize and Draw the shape and size of objects through different views

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

Course Title:	Introduction to C Programming		
Course Code:	**22ESC145/245**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	30 hours	Credits	03

MODULES	TeachingHours
Module-I **Algorithms, Flowcharts, Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output:** Arithmetic operators,relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	6 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	6 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	6 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	6 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	6 hours

Text book:

1. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

1. Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017
2. Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.
3. Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.
4. Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs – 22ESC145/245

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
      +   +
    +   +   +
      +   +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even.

ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers.

iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same.

ii) Read float elements and display the same.

iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

1. C Program to find Mechanical Energy of a particle using $E = mgh+1/2\ mv^2$.
2. C Program to convert Kilometers into Meters and Centimeters.
3. C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
4. Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
5. Implement Matrix multiplication and validate the rules of multiplication.
6. Compute sin(x)/cos(x) using Taylor series approximation. Compare you result with the built-in library function. Print both the results with appropriate inferences.
7. Sort the given set of N numbers using Bubblesort.
8. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
9. Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
10. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers

Communicative English		
Subject code	22ENG16/26	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

Prerequisite: Nil

Course objectives: The course Communicative English (22ENG16) will enable the students,

1. To know about Fundamentals of Communicative English and Communication Skills in general.
2. To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better Communication skills.
3. To impart Basic English grammar and essentials of important language skills.
4. To enhance with English vocabulary and language proficiency for better communication skills.
5. To learn about Techniques of Information Transfer through presentation.

MODULES	TeachingHours
Module-I **Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	3 hours
Module-II **Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants andvowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	3 hours
Module-III **Basic English Communicative Grammar and Vocabulary PART - I :**Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words,Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	3 hours
Module -IV **Basic English Communicative Grammar and Vocabulary PART - II:**Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence ofTenses (Rules in use of Tenses) and Exercises on it.	3 hours
Module-V **Communication Skills for Employment :**Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises. **Self-learning: Abrasives**: Introduction, classification, properties and application of silicon carbide (carborandum).	3 hours

Text book:

1) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
2) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference books:

1. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
2. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
3. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
4. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
5. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

Indian Constitution		
Subject code	**22ICO17/27**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

Prerequisite: Nil

Course objectives

The course **INDIAN CONSTITUTION (22ICO17 / 27)** will enable the students,

1. To know about the basic structure of Indian Constitution.
2. To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
3. To know about our Union Government, political structure & codes, procedures.
4. To know the State Executive & Elections system of India.
5. To learn the Amendments and Emergency Provisions, other important provisions given by the constitution.

MODULES	TeachingHours
Module-I Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	3 hours
Module-II Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.	3 hours
Module-III Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	3 hours
Module -IV Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	3 hours
Module-V State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3 hours

Text book:

1. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

Reference books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

Course outcome (Course Skill Set)

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

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Scientific Foundations of Health		
Subject code	**22SFH18/28**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.	3 hours
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components forhealth, Wellness and physical function, How to avoid exercise injuries.	3 hours
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.	3 hours
Module -IV **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictivepeople and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.	3 hours
Module-V **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.	3 hours

Text book:

1. **"Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU-University Website.**
2. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
3. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference books:

1. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
2. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles,McGraw Hill Education (India) Private Limited - Open University Press.
3. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
4. **Scientific Foundations of Health (Health & Welness) - General Books** published for university andcolleges references by popular authors and published by the reputed publisher.

Course outcome (Course Skill Set)

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

Course Title: **Mathematics-II for Civil Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	22MATC21	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory +10 Lab slots	Exam Hours	03

Module-1 Vector Calculus (6L+3T)

Introduction to Vector Calculus in Civil Engineering applications.
Vector Differentiation: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.
Vector Integration: Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stoke's theorem. Problems.
Self-Study: Volume integral and Gauss divergence theorem.
Applications: Heat and mass transfer, oil refinery problems, environmental engineering. Analysis of streamlines, velocity and acceleration of a moving particle.**(RBT Levels: L1, L2 and L3)**

Module-2 Ordinary Differential Equations of higher order (6L+2T)

Importance of higher-order ordinary differential equations in Civil Engineering applications.
Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations - Problems.
Self-Study: Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients.**Applications:** Oscillations of a spring, Transmission lines, Highway engineering.
(RBT Levels: L1, L2 and L3)

Module-3 Partial Differential Equations (PDEs) (5L+3T)

Importance of partial differential equations for Civil Engineering applications
Formation of PDE's by elimination of arbitrary constants and functions. Solution of nonhomogeneous PDE by direct integration. Homogeneous PDEs involving derivatives with respect to one independent variable only. Solution of Lagrange's linear PDE. Derivation of one-dimensional heat equation and wave equation.
Self-Study: Solution of one-dimensional heat equation and wave equation by the method of separation of variables.
Applications: Design of structures (vibration of rod/membrane)**(RBT Levels: L1, L2 and L3)**

Module-4 Numerical Methods -1 (6L+3T)

Importance of numerical methods for discrete data in the field of Civil Engineering.
Solution of algebraic and transcendental equations: Regula-Falsi and Newton-Raphson methods (only formulae). Problems.
Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.
N**umerical integration**: Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof). Problems.
Self-Study: Bisection method, Lagrange's inverse Interpolation**.**
Applications: Estimating the approximate roots, extremum values, Area, volume, and surface area. Finding approximate solutions to civil engineering problems.**(RBT Levels: L1, L2 and L3)**

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding gradient, divergent, curl and their geometrical interpretation
2	Verification of Green's theorem
3	Solutions of Second-order ordinary differential equations with initial/boundary conditions
4	Solution of a differential equation of oscillations of a spring/deflection of a beam with different loads
5	Solution of one-dimensional heat equation and wave equation
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7	Interpolation/Extrapolation using Newton's forward and backward difference formula
8	Computation of area under the curve using Trapezoidal, Simpson's $(1/3)^{rd}$ and $(3/8)^{th}$ rule
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method

10	Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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

CO 1	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
CO 2	Analyze the solution of higher order ordinary differential equations..
CO 3	Demonstrate partial differential equations and their solutions for physical interpretations.
CO 4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
CO 5	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	**Physics for CV Stream**		
Course Code:	**22PHYC12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab slots	Credits	04

Module-1 (8 Hours)

Module -I: Oscillations and Shock waves:

Oscillations: Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Sprigs: Stiffness Factor and its Physical Significance, Series and Parallel combination of springs (Derivation), Types of Springs and their applications. Theory of Damped oscillations (Qualitative), Types of Damping (Graphical Approach). Engineering applications of Damped oscillations, Theory of Forced oscillations (Qualitative), Resonance, Sharpness of resonance. Numerical Problems.

Shock waves: Mach number and Mach Angle, Mach Regimes, Definition and Characteristics of Shock waves, Construction and working of Reddy Shock tube, Applications of Shock Waves, Numerical problems.

Pre-requisites: Basics of Oscillations

Self-learning: Simple Harmonic motion, Differential equation for SHM

Module-2 (8 Hours)

Elasticity

Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio. Beams, Bending moment and derivation of expression, Cantilever and I section girder and their Engineering Applications, Elastic materials (qualitative). Failures of engineering materials - Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), Numerical problems.

Pre requisites: Elasticity, Stress & Strain

Self-learning: Stress-Strain Curve

Module-3 (8 Hours)

Acoustics, Radiometry and Photometry:

Acoustics: Introduction to Acoustics, Types of Acoustics, Reverberation and reverberation time, Absorption power and Absorption coefficient, Requisites for acoustics in auditorium, Sabine's formula (derivation), Measurement of absorption coefficient, Factors affecting the acoustics and remedial measures, Sound Insulation and its measurements. Noise and its Measurements, Impact of Noise in Multi-storied buildings.

Radiometry and Photometry: Radiation Quantities, Spectral Quantities, Relation between luminance and Radiant quantities, Reflectance and Transmittance, Photometry (cosine law and inverse square law).

Prerequisites: Basics of Sound, Waves & light properties.Self-learning: Introduction to acoustics.

Module-4 (8 Hours)

Photonics:

LASER

Properties of a LASER Beam, Interaction of Radiation with Matter, LASER action, Population Inversion, Metastable State, Requisites of a LASER System, Semiconductor LASER, LASER Range Finder, LIDAR, Road Profiling, Bridge Deflection, Speed Checker, Numerical Problems.

Optical Fiber

Principle and Construction of Optical Fibers, Acceptance angle and Numerical Aperture (NA), Expression for NA, Modes of Propagation, Attenuation and Fiber Losses, Fiber Optic Displacement Sensor, Fiber Optic Temperature Sensor, Numerical Problems

re requisite: Properties of light.

Self-learning: Total Internal Reflection.

Module-5 (8 Hours)

Natural hazards and Safety

Introduction, Earthquake, (general characteristics, Physics of earthquake, Richter scale of measurement and earth quake resistant measures), Tsunami (causes for tsunami, characteristics, adverse effects, risk reduction measures, engineering structures to withstand tsunami), Landslide (causes such as excess rain fall, geological structure, human excavation etc., types of land slide, adverse effects, engineering solution for landslides). Forest Fires and detection using remote sensing. Fire hazards and fire protection, fire-proofing materials, fire safety regulations and firefighting equipment-Prevention and safety measures. Numerical Problems.

Pre requisite: Oscillations. Self-learning: Richter scale.

Course outcome (Course Skill Set)

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

CO1 **Elucidate** the concepts in oscillations, waves, elasticity and material failures

CO2 **Summarize** concepts of acoustics in buildings and explain the concepts in radiation and photometry

CO3 **Discuss** the principles photonic devices and their application relevant to civil engineering.

CO4 **Describe** the various natural hazards and safety precautions.

CO5 **Practice** working in groups to conduct experiments in physics and **perform** precise and honest measurements.

Laboratory Component:

Any Ten Experiments have to be completed from the list of experiments

Note: The experiments have to be classified into

a) Exercise
b) Demonstration
c) Structured Inquiry
d) Open Ended

Based on the convenience classify the following experiments into above categories. Select at least one simulation/spreadsheet activity.

List of Experiments

1. Determination of Young's modulus of the material of the given bar Uniform Bending.
2. Determination of Rigidity modulus of the Material of the wire using Torsional Pendulum.
3. Study of Forced Mechanical Oscillations and Resonance.
4. Study of the frequency response of Series & Parallel LCR circuits.
5. Determination of Fermi Energy of the given Conductor.
6. Determination of Resistivity by Four Probe Method.
7. Determination of effective spring constant of the given springs in series and parallel combinations.
8. Determination of Young's modlus of the material of the given bar Single Cantilever.
9. Determination of the the Moment of Inertia of the given irregular body using torsional pendulum.
10. Determination of Wavelength of Laser using Diffraction Grating.
11. Determination of Acceptance angle and Numerical Aperture of the given Optical Fiber.
12. Determination of the Radius of Curvature of the given Plano Convex Lens by setting Newton's Rings.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Application of Statistics using Spread Sheets.
16. PHET Interactive Simulations :
17. Fly wheel
18. Interference of air wedge

(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)

ENGINEERING MECHANICS		
Subject code	22CIV13/23	Credit: 03
Hours/Week:	2 hours. (Theory)	SEE: 50 Marks
Total hours: 50	CIE: 50 Marks	SEE: 3 hours

MODULES	TeachingHours
Module-I **Resultant of coplanar force system:** Basic dimensions and units, Idealisations, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment, Principle of moments, couple, Resultant of coplanar concurrent force system, Resultant of coplanar non-concurrent force system, Numerical examples.	10 hours
Module-II **Equilibrium of coplanar force system:** Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical examples.	10 hours
Module-III **Analysis of Trusses:** Introduction, Classification of trusses, analysis of plane perfect trusses by themethod of joints and method of sections, Numerical examples. **Friction:** Introduction, laws of Coulomb friction, equilibrium of blocks on horizontal plane,equilibrium of blocks on inclined plane, ladder friction, wedge friction Numerical examples.	10 hours
Module -IV **Centroid of Plane areas:** Introduction, Locating the centroid of rectangle, triangle, circle, semicircle, quadrant and sector of a circle using method of integration, centroid of composite areas and simple built up sections, Numerical examples. **Moment of inertia of plane areas:** Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built up sections,, Numerical examples.	10 hours
Module-V **Kinematics:** Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity,Numerical examples on linear motion Projectiles: Introduction, numerical examples on projectiles. **Kinetics:** Introduction, D 'Alembert's principle of dynamic equilibrium and its application in-plane motion and connected bodies including pulleys, Numerical examples.	10 hours

Text book:

1. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015,Laxmi Publications.
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2014, EBPB

Reference books:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill.
2. Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall.
3. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.
4. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press.
5. Bhavikatti S S, Engineering Mechanics, 2019, New Age International
6. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication

Course outcome (Course Skill Set)

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

CO1	Compute the resultant of a force system and resolution of a force
CO2	Comprehend the action for forces, moments, and other types of loads on rigid bodies and compute the reactive forces
CO3	Analyse the frictional resistance offered by different planes
CO4	Locate the centroid and compute the moment of inertia of sections
CO5	Analyze the bodies in motion

Course Title:	**INTRODUCTION TO MECHANICAL ENGINEERING**		
Course Code:	22ESC144/244	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Course Learning Objectives

CLO 1. Acquire a basic understanding about scope of mechanical engineering, fundamentals about steam and non-conventional energy sources.

CLO 2. Acquire a basic knowledge about conventional and advanced manufacturing processes.

CLO 3. Acquiring a basic understanding about IC engines, propulsive devices and air-conditioner.

CLO 4. Acquiring a basic knowledge about power transmission and joining processes.

CLO 5. Acquiring a basic insight into future mobility and mechatronics and robotics.

Teaching-Learning Process

- Adopt different types of teaching methods to develop the outcomes through Power Point presentations and Video demonstrations or Simulations.
- Arrange visits to show the live working models other than laboratory topics.
- Adopt collaborative (Group Learning) Learning in the class.
- Adopt Problem Based Learning (PBL), which foster students' Analytical skills and develops thinking skills such as evaluating, generalizing, and analyzing information.

Module-1 (8 hours)

Introduction to Mechanical Engineering (Overview only):

Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Steam Formation and Application:

Modes of heat transfer, Steam formation, Types of steam, Steam properties and applications of steam (simple numerical problems).

Energy Sources and Power Plants:

Basic working principles of Hydel power plant, Thermal power plant, nuclear power plant, Solar power plant, Tidal power plant and Wind power plant.

Module-2 (8 hours)

Machine Tool Operations:

Lathe: Principle of working of a center lathe, lathe operations: Turning, facing, knurling, thread cutting, taper turning by swivelling the compound rest,

Drilling Machine: Working of simple drilling machine, drilling operations: drilling, boring, reaming, tapping, counter sinking, counter boring,

Milling Machine: Working and types of milling machine, milling operations: plane milling, end milling and slot milling.

(No sketches of machine tools, sketches to be used only for explaining the operations).

Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantages and applications of CNC, 3D printing.

Module-3 (8 hours)

Introduction to IC Engines: Components and working principles, 4-Stroke Petrol and Diesel engines, Application of IC Engines, performance of IC engines (Simple numerical).

Introduction to Refrigeration and Air Conditioning: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner & Applications of air Conditioners

Module-4 (8 hours)

Mechanical Power Transmission:

Gear Drives: Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)

Belt Drives: Introduction, Types of belt drives (Flat and V-Belt Drive), length of the belt and tensions ratio (simple numerical problems)

Joining Processes: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding, MIG welding and Fusionwelding.

Module-5 (8 hours)

Insight into future mobility technology; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.

Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing and assembly andinspection.

Course outcome (Indicative)

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

CO1	Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources
CO2	Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.
CO3	Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics
CO4	Determine the condition of steam and its energy, performance parameters of IC engines, velocity ratio and power transmitted through power transmission systems.
CO5	Explain the Working Principle of EV vehicles and concepts of Mechatronics and Robotics

Suggested Learning Resources:

Test Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008
2. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, MediaPromotersand Publishers Pvt. Ltd., 2010.

Reference Books

1. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012

Professional Writing Skills in English		
Subject code	**22PWS16/26**	Credit: 0
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

MODULES	**TeachingHours**
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	3 hours
Module-II **Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction andConclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	3 hours
Module-III **Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error& Sentence Improvement, Cloze Test and Theme Detection Exercises.	3 hours
Module -IV **Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	3 hours
Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and itsimportance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	3 hours

Text book:

1) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
2) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].

Reference books:

1) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
2) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
3) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
4) **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
5) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

Course outcome (Course Skill Set)

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills.
CO5	To learn about Techniques of Information Transfer through presentation in different level.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KSK17 / 27	**SAMSKRUTHIKA KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 - 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22KSK17/27) will enable the students,

1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸಿವುದು.
3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)

1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ
2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ
3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ. ವಿ. ಕೇಶವಮೂರ್ತಿ

ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)

1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.
2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು
   ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು
3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)

1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್
2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ

ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)

1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

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

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KBK17 / 27	**BALAKE KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 – 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22K**B**K17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Module - 1	**(03 hours of pedagogy)**
1.	Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2.	Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription
3.	ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2	(03 hours of pedagogy)
1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - **Possessive forms of nouns, dubitive question and Relative nouns** 2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು **Qualitative, Quantitative and Colour Adjectives, Numerals** 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –**Predictive Forms, Locative Case**	
Module - 3	**(03 hours of pedagogy)**
1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - **Dative Cases, and Numerals** 2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು -**Ordinal numerals and Plural markers** 3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –**Defective/Negative Verbs & Colour Adjectives**	
Module- 4	**(03 hours of pedagogy)**
1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು **Permission, Commands, encouraging and Urging words (Imperative words and sentences)** 2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು **Accusative Cases and Potential Forms used in General Communication** 3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs 4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words	
Module - 5	**(03 hours of pedagogy)**
1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs 2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms 3. **Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation**	

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Pattern of question paper

1. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

INNOVATION and DESIGN THINKING			
Subject code	21IDT18/28	Credit: 01	
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks	
Total hours: 25	CIE: 50 Marks	SEE: 2 hours	

MODULES		Hours
Module-I **PROCESS OF DESIGN** **Understanding Design thinking** Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping		
Teaching-Learning Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
Module-II **Tools for Design Thinking** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design		
Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-III **Design Thinking in IT** Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenario based Prototyping		
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module -IV **DT For strategic innovations** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.		
Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-V Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		
Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

Text book:

1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.
3. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
4. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.

Reference books:

1. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
2. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett

Course outcome (Course Skill Set) At the end of the course the student will be able to:

CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through differenttechnique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

P.D.A College of Engineering Kalaburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE)and Choice Based Credit System (CBCS) (Effective from the academic year 2022-23)

I Semester (Civil Engineering Stream) **(Chemistry Group)**

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				
					The	Tutorial	Practic	SDA	Duration in	CIE M	SEE	Total	
						T	P	S					
1	ASC(IC)	22MATC11	Mathematics for Civil Engg Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHEC12	Chemistry for Civil Engg Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED13	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC145	Introduction to C Programming	Respective EnggDept	3	0	0	0	03	50	50	100	03
5	ETC-I	22ETC15X	Emerging Technology Courses		3	0	0	0	03				
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMS	22ICO17/27	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	22SFH18	Scientific Foundations of Health	AnyDept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

P.D.A College of Engineering Kalburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education(OBE)and Choice Based Credit System(CBCS) (Effective from the academic year 2022-23)

II Semester (Civil Engineering Stream) **(Physics Group)** 1

Sl. No	Course and CourseCode		CourseTitle	TD/PSB	Teaching Hours/Week				Examination				2
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATC21	Mathematics for Civil Engg stream-II	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYC22	Physics for Civil Engg Stream	PHY	2	2	2	0	03	50	50	100	04
3	ESC	22CIV23	Engineering Mechanics	CivilEngineering Dept	2	2	0	0	03	50	50	100	03
4	ESC-I	22ESC242	Introduction To Electrical Engineering	Respective Engg dept	3	0	0	0	03	50	50	100	03
5.	PLC-I	22PLC25X	Programming Language Courses-I&II		2	0	2	0	03	50	50	100	03
6	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	1.5	50	50	100	01
8	AEC/SDC	22IDT28	Innovation and Design Thinking	Any Dept	1	0	0	0	01	50	50	100	01
				total						400	400	800	20

Course Title: **Mathematics-I for Civil Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	22MATC11	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory +10 Lab slots	Exam Hours	03

Module-1 Calculus (5L+3T)

Introduction to polar coordinates and curvature relating to Civil engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, and angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems.**Self-study:** Center and circle of curvature, evolutes and involutes.

Applications: Applied Mechanics, Structural design and paths, Strength of materials, Elasticity.**(RBT Levels: L1, L2 and L3)**

Module-2 Series Expansion and Multivariable Calculus (6L+3T)

Introduction to series expansion and partial differentiation in the field of Civil engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems.
Indeterminate forms – L'Hospital's rule, problems.
Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables – Simple Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

Applications: Computation of stress and strain, Errors and approximations, Estimating the critical points and extreme values**(RBT Levels: L1, L2 and L3)**

Module-3 Ordinary Differential Equations (ODEs) of first order (6L+2T)

Introduction to first-order ordinary differential equations pertaining to the applications for Civil engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$

Orthogonal trajectories and Newton's law of cooling.

Nonlinear differential equations: Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations - Problems**.**

Self-Study: Applications of ODE's in Civil Engineering problems like bending of the beam, whirling of shaft, solution of non-linear ODE by the method of solvable for x and y.

Applications: Rate of Growth or Decay, Conduction of heat.**(RBT Levels: L1, L2 and L3)**

Module-4 Integral Calculus (6L+3T)

Introduction to Integral Calculus in Civil Engineering applications.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions. Problems.

Self-Study: Volume by triple integration, Center of gravity.

Applications: Applications to mathematical quantities (Area, Surface area, Volume), Analysis of probabilistic models.**(RBT Levels: L1, L2 and L3)**

Module-5 Linear Algebra (5L+3T)

Introduction of linear algebra related to Civil Engineering applications.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector.

Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications: Structural Analysis, Balancing equations.**(RBT Levels: L1, L2 and L3)**

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigenvectors and find the largest and smallest eigen value by Rayleigh power method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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

CO 1	Apply the knowledge of calculus to solve problems related to polar curves
CO 2	Learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 3	Analyze the solution of linear and nonlinear ordinary differential equations
CO 4	Apply the knowledge of multiple integrals to compute area and volume.
CO 5	Make use of matrix theory for solving for system of linear equations and compute eigen values and eigen vectors. Familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB

Course Title:	Chemistry for Civil Engineeringstream		
Course Code:	**22CHEC12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)[1]	2:2:2:0	ExamHours	03+02
Total Hours of Pedagogy	40 hours Theory +10 to 12 Lab slots	Credits	04

Module-1: Structural Materials (8 hr)

Metals and Alloys: Introduction, Properties and application of Iron and its alloys, Aluminium and its alloys.
Cement: Introduction, composition, properties, classification, manufacturing process of cement, process of setting and hardening of cement, additives for cement and testing of cement.
Refractories: Introduction, classification based on chemical composition, properties and application of refractory materials. **Glass:** Introduction, Composition, Types, Preparation of Soda-lime glass, properties and applications of glass.
Self-learning: Chemistry of reinforced concrete from various sources of water (seawater, groundwater, treated water).

Module-2: Energy Conversion and Storage, Corrosion (8 hr)

Energy conversion: Introduction, construction, working, and applications of Na-ion cell, methanol-oxygen fuel cell.
Storage devices: Introduction, construction and working of Li-ion battery.

Corrosion: Introduction, mechanism of electrochemical corrosion with iron as an example, types (differential metal and aeration), Stress corrosion, corrosion control galvanization, anodization and sacrificial anode method. Factors affecting corrosion (EMF, Temperature, pH, relative area of anode and cathode and polarization).
Self-learning: Corrosion inhibitors.

Module-3: Water Technology and Nanotechnology (8 hr)

Water technology: Introduction, sources and nature of impurities of water, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by Lime-Soda Process, determination of COD, numerical problems. Purification of water by Reverse osmosis and chlorination methods.**Nanotechnology:** Introduction, properties and engineering application of carbon nanotubes, graphene and nanomaterials for water treatment(metal oxide)
Self-learning: Introduction, classification, properties and application of silicon carbide.

Module-4:Polymer and Composites (8 hr)

Polymers: Introduction, types of polymerization, free radical mechanism of addition polymerization, techniques of addition polymerization, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC) and polystyrene.
Conducting polymers – synthesis and conducting mechanism of Polyacetylene
Fibers: Introduction, synthesis, properties and industrial applications of Kevlar and Polyester.
Plastics: Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon.**Adhesives:** Introduction, synthesis, properties and application of epoxy resin.
Polymer Composite: Introduction, properties and applications of fibre reinforced polymer composites.
Self-learning: Biopolymer: Introduction, structural properties, and applications ofcellulose and lignin, synthesis of polylactic acid and their application.

Module-5:Phase Rule and Analytical Techniques (8 hr)

Phase rule: Introduction, Definition of terms: phase, components, degree of freedom, phase rule equation. Phase diagram: Two component-lead-silver system.
Analytical techniques: Introduction, principle, instrumentation of potentiometric sensors; its application in the estimation of iron, Optical sensors (colorimetry); its application in the estimation of the copper, pH-sensor (Glass electrode); its application in the determinationof pH of beverages.
Self-learning: Determination of viscosity of biofuel and its correlation with temperature.

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:

A1. Synthesis of polyurethane
A2. Quantitative estimation of Aluminium by precipitation methodA3. Synthesis of iron oxide nanoparticles
A4. Determination of chloride content in the given water sample by Argentometric method

B – Exercise (compulsorily any 4 to be conducted):

B1.Conductometric estimation of acid mixture
B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$

B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss methodB5.Estimation of total hardness of water by EDTA method

C – Structured Enquiry (compulsorily any 4 to be conducted):

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)
C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method C4. Estimation of Sodium present in soil/effluent sample using flame photometry
C5. Determination of Chemical Oxygen Demand(COD) of industrial waste water sample

D – Open Ended Experiments (any two):

D1. Gravimetric estimation of gypsum in Portland cementD2.
Electroplating of desired metal on substrate
D3. Estimation of manganese dioxide in pyrolusite
D4. Analysis of cement for its components

Course Title:	**COMPUTER AIDED ENGINEERING DRAWING**		
Course Code	**22CED13/23**	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

Module-1

Introduction: ***for CIE only***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

Application on projections of Lines & Planes (For CIE only)

Module-2

Orthographic Projection of Solids:

Orthographic projection of right regular solids (**Solids Resting on HP only**): Prisms & Pyramids (square, pentagon, hexagon), Cylinders, Cones, Cubes .

Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).

Module-3

Isometric Projections:

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones andspheres. Isometric projection of combination of two simple solids.

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components.

Introduction to drawing views using 3D environment (For CIE only).

Module-4

Development of Lateral Surfaces of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Module-5

Multidisciplinary Applications & Practice ***(For CIE Only):***

Free hand Sketching; True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts todimensions etc

Electric Wiring and lighting diagrams; Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

Basic Building Drawing; Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges,trusses using Auto CAD or suitable software,

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts: Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or anysuitable software.

Course Outcomes

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

CO 1. Draw and communicate the objects with definite shape and dimensions

CO 2. Recognize and Draw the shape and size of objects through different views

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

Course Title:	Introduction to C Programming		
Course Code:	**22ESC145/245**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	TeachingHours
Module-I **Algorithms, Flowcharts, Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output:** Arithmetic operators,relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	8 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	8 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	8 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	8 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	8 hours

Text book:

2. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

5. Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017
6. Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.
7. Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.
8. Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs – 22ESC145/245

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
      +   +
    +   +   +
      +   +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even.

ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers.

iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same.

ii) Read float elements and display the same.

iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

11. C Program to find Mechanical Energy of a particle using $E = mgh+1/2\ mv^2$.
12. C Program to convert Kilometers into Meters and Centimeters.
13. C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
14. Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
15. Implement Matrix multiplication and validate the rules of multiplication.
16. Compute sin(x)/cos(x) using Taylor series approximation. Compare you result with the built-in library function. Print both the results with appropriate inferences.
17. Sort the given set of N numbers using Bubblesort.
18. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
19. Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
20. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers

Communicative English

Subject code	22ENG16	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 .5hours

MODULES	Hours
Module-I **Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process ofCommunication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	3 hrs
Module-II **Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	3 hrs
Module-III **Basic English Communicative Grammar and Vocabulary PART - I :**Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words,Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	3 hrs
Module -IV **Basic English Communicative Grammar and Vocabulary PART - II:**Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence ofTenses (Rules in use of Tenses) and Exercises on it.	3 hrs
Module-V **Communication Skills for Employment :**Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises. **Self-learning: Abrasives**: Introduction, classification, properties and application of silicon carbide (carborandum).	3 hrs

Text book:

3) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
4) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by InfiniteLearning Solutions, Bengaluru - 2022.

Reference books:

6. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learningIndia Pvt Limited [Latest Revised Edition] - 2019.
7. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
8. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited[Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
9. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
10. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

Course outcome (Course Skill Set)

At the end of the course Communicative English (22ENG16) the student will be able to:

CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation.

Indian Constitution		
Subject code	**22ICO17/27**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	**TeachingHours**
Module-I Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	3 hours
Module-II Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.	3 hours
Module-III Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	3 hours
Module -IV Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	3 hours
Module-V State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3 hours

Text book:

3. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
4. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

Reference books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

Course outcome (Course Skill Set)

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

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Scientific Foundations of Health		
Subject code	**22SFH18/28**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.	3 hours
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components forhealth, Wellness and physical function, How to avoid exercise injuries.	3 hours
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.	3 hours
Module -IV **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictivepeople and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.	3 hours
Module-V **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.	3 hours

Text book:

4. **"Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU-University Website.**
5. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
6. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference books:

5. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
6. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles,McGraw Hill Education (India) Private Limited - Open University Press.
7. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
8. **Scientific Foundations of Health (Health & Welness) - General Books** published for university andcolleges references by popular authors and published by the reputed publisher.

Course outcome (Course Skill Set)

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

Course Title: **Mathematics-II for Civil Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	22MATC21	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory+10 Lab slots	Exam Hours	03

Module-1 Vector Calculus (6L+3T)

Introduction to Vector Calculus in Civil Engineering applications.

Vector Differentiation: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.

Vector Integration: Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stoke's theorem. Problems.

Self-Study: Volume integral and Gauss divergence theorem.

Applications: Heat and mass transfer, oil refinery problems, environmental engineering. Analysis of streamlines, velocity and acceleration of a moving particle.**(RBT Levels: L1, L2 and L3)**

Module-2 Ordinary Differential Equations of higher order (6L+2T)

Importance of higher-order ordinary differential equations in Civil Engineering applications.

Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations - Problems.

Self-Study: Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients.

Applications: Oscillations of a spring, Transmission lines, Highway engineering.**(RBT Levels: L1, L2 and L3)**

Module-3 Partial Differential Equations (PDEs) (5L+3T)

Importance of partial differential equations for Civil Engineering applications

Formation of PDE's by elimination of arbitrary constants and functions. Solution of nonhomogeneous PDE by direct integration. Homogeneous PDEs involving derivatives with respect to one independent variable only. Solution of Lagrange's linear PDE. Derivation of one-dimensional heat equation and wave equation.

Self-Study: Solution of one-dimensional heat equation and wave equation by the method of separation of variables.

Applications: Design of structures (vibration of rod/membrane)**(RBT Levels: L1, L2 and L3)**

Module-4 Numerical Methods -1 (6L+3T)

Importance of numerical methods for discrete data in the field of Civil Engineering.

Solution of algebraic and transcendental equations: Regula-Falsi and Newton-Raphson methods (only formulae). Problems.

Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.

N**umerical integration**: Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof). Problems.

Self-Study: Bisection method, Lagrange's inverse Interpolation**.**

Applications: Estimating the approximate roots, extremum values, Area, volume, and surface area. Finding approximate solutions to civil engineering problems. **(RBT Levels: L1, L2 and L3)**

Module-5 Numerical Methods -2 (5L+3T)

Introduction to various numerical techniques for handling Civil Engineering applications.

Numerical Solution of Ordinary Differential Equations (ODE's): Numerical solution of ordinary differential equations of first order and first degree – Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor-corrector formula (No derivations of formulae). Problems.

Self-Study: Adam-Bashforth method.

Applications: Finding approximate solutions to ODE related to civil engineering fields**(RBT Levels: L1, L2 and L3)**

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding gradient, divergent, curl and their geometrical interpretation
2	Verification of Green's theorem
3	Solutions of Second-order ordinary differential equations with initial/boundary conditions
4	Solution of a differential equation of oscillations of a spring/deflection of a beam with different loads
5	Solution of one-dimensional heat equation and wave equation
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7	Interpolation/Extrapolation using Newton's forward and backward difference formula
8	Computation of area under the curve using Trapezoidal, Simpson's $(1/3)^{rd}$ and $(3/8)^{th}$ rule
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
10	Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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

CO 1	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
CO 2	Analyze the solution of higher order ordinary differential equations..
CO 3	Demonstrate partial differential equations and their solutions for physical interpretations.
CO 4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
CO 5	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	**Physics for CV Stream**		
Course Code:	**22PHYC12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab slots	Credits	04

Module-1 (8 Hours)

Module -I: Oscillations and Shock waves:

Oscillations: Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Sprigs: Stiffness Factor and its Physical Significance, Series and Parallel combination of springs (Derivation), Types of Springs and their applications. Theory of Damped oscillations (Qualitative), Types of Damping (Graphical Approach). Engineering applications of Damped oscillations, Theory of Forced oscillations (Qualitative), Resonance, Sharpness of resonance. Numerical Problems.

Shock waves: Mach number and Mach Angle, Mach Regimes, Definition and Characteristics of Shock waves, Construction and working of Reddy Shock tube, Applications of Shock Waves, Numerical problems.

Pre-requisites: Basics of Oscillations

Self-learning: Simple Harmonic motion, Differential equation for SHM

Module-2 (8 Hours)

Elasticity

Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio. Beams, Bending moment and derivation of expression, Cantilever and I section girder and their Engineering Applications, Elastic materials (qualitative). Failures of engineering materials - Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), Numerical problems.

Pre requisites: Elasticity, Stress & Strain

Self-learning: Stress-Strain Curve

Module-3 (8 Hours)

Acoustics, Radiometry and Photometry:

Acoustics: Introduction to Acoustics, Types of Acoustics, Reverberation and reverberation time, Absorption power and Absorption coefficient, Requisites for acoustics in auditorium, Sabine's formula (derivation), Measurement of absorption coefficient, Factors affecting the acoustics and remedial measures, Sound Insulation and its measurements. Noise and its Measurements, Impact of Noise in Multi-storied buildings.

Radiometry and Photometry: Radiation Quantities, Spectral Quantities, Relation between luminance and Radiant quantities, Reflectance and Transmittance, Photometry (cosine law and inverse square law).

Prerequisites: Basics of Sound, Waves & light properties.Self-learning: Introduction to acoustics.

Module-4 (8 Hours)

Photonics:

LASER

Properties of a LASER Beam, Interaction of Radiation with Matter, LASER action, Population Inversion, Metastable State, Requisites of a LASER System, Semiconductor LASER, LASER Range Finder, LIDAR, Road Profiling, Bridge Deflection, Speed Checker, Numerical Problems.

Optical Fiber

Principle and Construction of Optical Fibers, Acceptance angle and Numerical Aperture (NA), Expression for NA, Modes of Propagation, Attenuation and Fiber Losses, Fiber Optic Displacement Sensor, Fiber Optic Temperature Sensor, Numerical Problems

Pre requisite: Properties of light.

Self-learning: Total Internal Reflection.

Module-5 (8 Hours)

Natural hazards and Safety

Introduction, Earthquake, (general characteristics, Physics of earthquake, Richter scale of measurement and earth quake resistant measures), Tsunami (causes for tsunami, characteristics, adverse effects, risk reduction measures, engineering structures to withstand tsunami), Landslide (causes such as excess rain fall, geological structure, human excavation etc., types of land slide, adverse effects, engineering solution for landslides). Forest Fires and detection using remote sensing. Fire hazards and fire protection, fire-proofing materials, fire safety regulations and firefighting equipment-Prevention and safety measures. Numerical Problems.

Pre requisite: Oscillations. Self-learning: Richter scale.

Course outcome (Course Skill Set)

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

CO1 **Elucidate** the concepts in oscillations, waves, elasticity and material failures

CO2 **Summarize** concepts of acoustics in buildings and explain the concepts in radiation and photometry

CO3 **Discuss** the principles photonic devices and their application relevant to civil engineering.

CO4 **Describe** the various natural hazards and safety precautions.

CO5 **Practice** working in groups to conduct experiments in physics and **perform** precise and honest measurements.

Laboratory Component:

Any Ten Experiments have to be completed from the list of experiments

Note: The experiments have to be classified into

e) Exercise

f) Demonstration

g) Structured Inquiry

h) Open Ended

Based on the convenience classify the following experiments into above categories. Select at least one simulation/spreadsheet activity.

List of Experiments

1. Determination of Young's modulus of the material of the given bar Uniform Bending.
2. Determination of Rigidity modulus of the Material of the wire using Torsional Pendulum.
3. Study of Forced Mechanical Oscillations and Resonance.
4. Study of the frequency response of Series & Parallel LCR circuits.
5. Determination of Fermi Energy of the given Conductor.
6. Determination of Resistivity by Four Probe Method.
7. Determination of effective spring constant of the given springs in series and parallel combinations.
8. Determination of Young's modlus of the material of the given bar Single Cantilever.
9. Determination of the the Moment of Inertia of the given irregular body using torsional pendulum.
10. Determination of Wavelength of Laser using Diffraction Grating.
11. Determination of Acceptance angle and Numerical Aperture of the given Optical Fiber.
12. Determination of the Radius of Curvature of the given Plano Convex Lens by setting Newton's Rings.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Application of Statistics using Spread Sheets.
16. PHET Interactive Simulations :
17. Fly wheel
18. Interference of air wedge

(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)

ENGINEERING MECHANICS		
Subject code	22CIV13/23	Credit: 03
Hours/Week:	2 hours. (Theory)	SEE: 50 Marks
Total hours: 50	CIE: 50 Marks	SEE: 3 hours

MODULES	TeachingHours
Module-I **Resultant of coplanar force system:** Basic dimensions and units, Idealisations, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment, Principle of moments, couple, Resultant of coplanar concurrent force system, Resultant of coplanar non-concurrent force system, Numerical examples.	10 hours
Module-II **Equilibrium of coplanar force system:** Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical examples.	10 hours
Module-III **Analysis of Trusses:** Introduction, Classification of trusses, analysis of plane perfect trusses by the method of joints and method of sections, Numerical examples. **Friction:** Introduction, laws of Coulomb friction, equilibrium of blocks on horizontal plane,equilibrium of blocks on inclined plane, ladder friction, wedge friction Numerical examples.	10 hours
Module -IV **Centroid of Plane areas:** Introduction, Locating the centroid of rectangle, triangle, circle, semicircle, quadrant and sector of a circle using method of integration, centroid of composite areas and simple built up sections, Numerical examples. **Moment of inertia of plane areas:** Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built up sections,, Numerical examples.	10 hours
Module-V **Kinematics:** Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity, Numerical examples on linear motion Projectiles: Introduction, numerical examples on projectiles. **Kinetics:** Introduction, D 'Alembert's principle of dynamic equilibrium and its application in-plane motion and connected bodies including pulleys, Numerical examples.	10 hours

Text book:

1. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering andEngineering Mechanics, 2015,Laxmi Publications.
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2014, EBPB

Reference books:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill.
2. Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall.
3. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.
4. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press.
5. Bhavikatti S S, Engineering Mechanics, 2019, New Age International
6. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication

Course outcome (Course Skill Set)

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

CO1	Compute the resultant of a force system and resolution of a force
CO2	Comprehend the action for forces, moments, and other types of loads on rigid bodies and compute the reactive forces
CO3	Analyse the frictional resistance offered by different planes
CO4	Locate the centroid and compute the moment of inertia of sections
CO5	Analyze the bodies in motion

Course Title: **INTRODUCTION TO ELECTRICAL ENGINEERING**		
Course Code	**22ESC142/242**	**CIE: 50**
Number of Lecture Hours/Week	**3hours (Theory)**	**SEE: 50**
Total Number of Lecture Hours	**40**	**SEE Hours: 03**

Modules	**Hours**
Module - I **Introduction:** Conventional and non-conventional energy resources; **Power Generation:** Hydel, Nuclear, Solar & wind power generation (Block Diagram approach). **Electromagnetism:** Faraday Laws of Electromagnetic Induction, Fleming's rules, Lenz's law, types of EMF and numerical.	**8hrs**
Module - II **A.C. Fundamentals:** Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical). **Three Phase Circuits:** Advantages, three phase connections (Star & Delta) (Excluding Derivations).	**8hrs**
Module - III **DC Machines:** **DC Generator**: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical. **DC Motor:** Principle of operation, back emf and its significance. Torque equation, types of motors, Applications of DC motors. Simple numerical. 3-point starter.	**8hrs**
Module - IV **Transformers:** Necessity of transformer, principle of operation, Types and construction of singlephase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical. Three-phase induction **Motors:** Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance simple numerical.	**8hrs**
Module – V **Domestic Wiring:** Requirements, Types of wiring: casing, capping. Two way and three way control of load. **Electricity Bill**: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. **Equipment Safety measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. **Personal safety measures:** Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	**8hrs**

Question paper pattern: Total ten questions will be asked,two from each module. The student has to answer five questions, selecting at least one from each module.

Reference books:

1. J P Tiwari," Basic Electrical Engineering", New age Publications, 2nd edition, 2011.
2. Rajendra Prasad "Fundamentals of Electrical Engineering", PHI 3rd edition, 2014.
3. B L Theraja& A K Theraja" Electrical Technology", Vol 1 , 2nd edition.
4. B L Theraja& A K Theraja" ABC of Electrical Engineering", 2nd edition.
5. D.P. Kothari and Nagrath "Theory and Problems in electrical Engineering", PHI edition 2011.
6. V. N. Mittal and Arvind Mittal;, " Basic Electrical Engineering" McGraw Hill.
7. R.V. Srinivasa Murthy "Basic Electrical Engineering" Sanguine Technical Publisher2004.

Course outcomes: On completion of the course, the student will have the ability to:

Course Code	**CO's**	**Course Outcome (CO)**
22ESC142/ 242	**CO1**	Understand the concepts of various energy sources and Electric circuits.
	CO2	Apply the basic Electrical laws to solve circuits.
	CO3	Discuss the construction and operation of various Electrical Machines.
	CO4	Identify suitable Electrical machine for practical implementation.
	CO5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.

Professional Writing Skills in English		
Subject code	**22PWS26**	Credit: 0
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

MODULES	TeachingHours
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	3 hours
Module-II **Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	3 hours
Module-III **Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error& Sentence Improvement, Cloze Test and Theme Detection Exercises.	3 hours
Module -IV **Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	3 hours
Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and its importance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	3 hours

Text book:

3) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
4) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learningIndia Pvt Limited [Latest Edition 2019].

Reference books:

6) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
7) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learningIndia Pvt Limited [Latest Revised Edition] - 2019.
8) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma,Oxford University Press 2017.
9) **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
10) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

Course outcome (Course Skill Set)

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills.
CO5	To learn about Techniques of Information Transfer through presentation in different level.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KSK17 / 27	**SAMSKRUTHIKA KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 - 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:
The course (22KSK17/27) will enable the students,

1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸಿವುದು.
3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)
1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ 2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ 3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ. ವಿ. ಕೇಶವಮೂರ್ತಿ
ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)
1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ. 2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು 3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ
ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)
1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಅಯ್ದ ಕೆಲವು ಭಾಗಗಳು 2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ 3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು
ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)
1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್ 2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ
ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)
1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ 2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :
At the end of the course the student will be able to:

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KBK17 / 27	**BALAKE KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 – 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22K**B**K17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Module - 1 **(03 hours of pedagogy)**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2 (03 hours of pedagogy)

1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - **Possessive forms of nouns, dubitive question and Relative nouns**
2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು **Qualitative, Quantitative and Colour Adjectives, Numerals**
3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –**Predictive Forms, Locative Case**

Module - 3 (03 hours of pedagogy)

1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - **Dative Cases, and Numerals**
2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು -**Ordinal numerals and Plural markers**
3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –**Defective/Negative Verbs & Colour Adjectives**

Module- 4 (03 hours of pedagogy)

1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು **Permission, Commands, encouraging and Urging words (Imperative words and sentences)**
2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು **Accusative Cases and Potential Forms used in General Communication**
3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs
4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words

Module - 5 (03 hours of pedagogy)

1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs
2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms
3. **Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation**

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.
4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Pattern of question paper

2. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

INNOVATION and DESIGN THINKING			
Subject code	21IDT18/28	Credit: 01	
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks	
Total hours: 25	CIE: 50 Marks	SEE: 2 hours	

MODULES		Hours
Module-I **PROCESS OF DESIGN** **Understanding Design thinking** Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping		
Teaching- Learni Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
Module-II **Tools for Design Thinking** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design		
Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-III **Design Thinking in IT** Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenario based Prototyping		
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module -IV **DT For strategic innovations** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.		
Teaching-LearningProcess	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-V Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		
Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

Text book:

5. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.
6. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.
7. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
8. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.

Reference books:

3. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
4. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

Course outcome (Course Skill Set)

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

CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through differenttechnique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI

Scheme of Teaching and Examinations-2022

Outcome-Based Education(OBE) and Choice Based Credit System (CBCS) (Effective from the academic year 2022-23)

I Semester (CSE Stream) (Physics Group)

Sl. No	Course and Course Code		Course Title	D/PSB	Teaching Hours/Week				Examination				Credits
					The	Tutori	Pract	SDA	Duration in hours	CIEM arks	SEE Mrks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATS11	Mathematics for CSE Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYS12	Physics for CSE stream	Physics	2	2	2	0	03	50	50	100	04
3	ESC	22POP13	Principles of Programming Using C	CSE	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC143	Introduction to Electronics Engineering	Respective Engg Dept	3	0	0	0	03	50	50	100	03
5	ETC-I	22ETC15X	Emerging Technology Courses	Any Engg Dept	3	0	0	0	03	50	50	100	03
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMC	22KSK17 22KBK17	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	1.5	50		100	01
8	AEC/SDC	22IDT18	Innovation and Design Thinking	Any Dept	1	0	0	0	02	50		100	01
				TOTAL						400	400	800	20

POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI

Scheme of Teaching and Examinations-2022

Outcome-Based Education(OBE)and Choice Based Credit System(CBCS) (Effective from the academic year 2022-23)

II Semester (CSE Stream) (For students attended 1st semester under Physics Group)

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theor	Tutorial	Practic	SDA	Duration in	CIE Mark	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATS21	Mathematics for CSE Stream -II	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHES22	Chemistry for CSE Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED23	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-II	22ESC242	Introduction to Electrical Engineering	Respective Engg. Dept	3	0	0	0	03	50	50	100	03
	ETC-II	2PLC25X	Programming Language Courses-I&II		3	0	0	0	03	50	50	100	03
6	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMS	22ICO17/27	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	22SFH28	Scientific Foundations of Health	Any Dept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

Course Title: **Mathematics-I for Computer Science and Engineering stream**

[As per Choice Based Credit System (CBCS) scheme]

(From the academic year 2022-23)

Course Code	22MATS11	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	40 hours Theory +10 or 12 Lab slots	Exam Hours	03

Module-1 Calculus (6L+3T)

Introduction to polar coordinates and curvature relating to Computer Science and engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems.

Self-study: Center and circle of curvature, evolutes and involutes.

Applications: Computer graphics, Image processing.**(RBT Levels: L1, L2 and L3)**

Module-2 Series Expansion and Multivariable Calculus (6L+3T)

Introduction of series expansion and partial differentiation in Computer Science & Engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems.

Indeterminate forms – L'Hospital's rule-Problems.

Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables. Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint

Applications: Series expansion in computer programming, Errors and approximations, calculators

(RBT Levels: L1, L2 and L3)

Module-3 Ordinary Differential Equations (ODEs) of first order (5L+3T)

Introduction to first-order ordinary differential equations pertaining to the applications for Computer Science & Engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations, Integrating factors on $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$. Orthogonal trajectories, L-R & C-R circuits. Problems.

Non-linear differential equations: Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations. Problems.

Self-Study: Applications of ODEs, Solvable for x and y.

Applications of ordinary differential equations: Rate of Growth or Decay2**(RBT Levels: L1, L2 and L3)**

Module-4 Integral Calculus (6L+2T)

Introduction to Integral Calculus in Computer Science & Engineering.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions. Simple Problems.

Self-Study: Center of gravity, Duplication formula.

Applications: Antenna and wave propagation, Calculation of optimum value in various geometries. Analysis of probabilistic models.**(RBT Levels: L1, L2 and L3)**

Module-5 Linear Algebra (5L+3T) Introduction of linear algebra related to Computer Science & Engineering.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigenvalues and Eigenvectors, Rayleigh's power method to find the dominant Eigenvalue and Eigenvector.

Self-Study: Solution of system of equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications: Boolean matrix, Network Analysis, Markov Analysis, Critical point of a network system. Optimum solution.**(RBT Levels: L1, L2 and L3)**

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigen vectors and find the largest and smallest eigen value by Rayleigh power method.

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Semester End Examination (SEE):

Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

Course outcome (Course Skill Set)

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

CO 1	apply the knowledge of calculus to solve problems related to polar curves and learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 2	analyze the solution of linear and nonlinear ordinary differential equations
CO 3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing area and volume.
CO 4	make use of matrix theory for solving for system of linear equations and compute eigen values and eigenvectors
CO 5	familiarize with modern mathematical tools namely MATHEMATICA/MATLAB/ PYTHON/ SCILAB

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	**Physics for CSE Stream**		
Course Code:	**22PHYS12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab slots	Credits	04

Module-1 (8 Hours)

Laser and Optical Fibers:

LASER: Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Metastable State, Requisites of a laser system, Semiconductor Diode Laser, Applications: Bar code scanner, Laser Printer, Laser Cooling(Qualitative), Numerical Problems.

Optical Fiber: Principle and Structure, Propagation of Light, Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Modes of Propagation, RI Profile, Classification of Optical Fibers, Attenuation and Fiber Losses, Applications: Fiber Optic networking, Fiber Optic Communication. Numerical Problems

Pre requisite: Properties of light Self-learning: Total Internal Reflection

Module-2 (8 Hours)

Quantum Mechanics:

de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Quantization of Energy States, Waveforms and Probabilities. Numerical Problems.

Pre requisite: Wave–Particle dualism

Self-learning: de Broglie Hypothesis

Module-3 (8 Hours)

Dielectric Properties:

polar and non-polar dielectrics.. Types of polarization mechanism(Electrical Polarization Mechanisms). Equation for internal field in liquids and solids (1D case & 3D solid). Classius-Mossoti equation(Derivation). Frequency dependence of dielectric constant/polarization. Numerical. Ferroelectric materials, Characteristic properties: Hysteresis loop and Curie Temperature. Application of dielectrics in transformers, Capacitors, Electrical Insulation. Numerical Problems.

.**Pre-requisites: Classical Free Electron Theory**

Self-learning: Dielectrics Basics

Module-4 (8 Hours)

Electrical Properties of Materials and Applications

Electrical Conductivity in metals

Resistivity and Mobility, Concept of Phonon, Matheissen's rule, Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory, Fermi Energy, Density of States, Fermi Factor, Variation of Fermi Factor With Temperature and Energy. Numerical Problems.

Superconductivity

Introduction to Super Conductors, Temperature dependence of resistivity, Meissner's Effect, Critical Field, Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), Quantum Tunnelling, High Temperature superconductivity, Josephson Junctions (Qualitative), DC and RF SQUIDs (Qualitative), Applications in Quantum Computing: Charge, Phase and Flux qubits, Numerical Problems.

Pre requisites: Basics of Electrical conductivitySelf-learning: Resistivity and Mobility

Module-5 (8 hours)

Applications of Physics in computing:

Physics of Animation:

Taxonomy of physics based animation methods, Frames, Frames per Second, Size and Scale, Weight and Strength, Motion and Timing in Animations, Constant Force and Acceleration, The Odd rule, Odd-rule Scenarios, Motion Graphs, Examples of Character Animation: Jumping, Parts of Jump, Jump Magnification, Stop Time, Walking: Strides and Steps, Walk Timing. Numerical Problems

Statistical Physics for Computing: Descriptive statistics and inferential statistics, Poisson distribution and modeling the probability of proton decay, Normal Distributions (Bell Curves), Monte Carlo Method: Determination of Value of π. Numerical Problems.

Pre requisites: Motion in one dimension, ProbabilitySelf-learning: Frames, Frames per Second

Course outcome (Course Skill Set)

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

CO1 **Describe** the principles of LASERS and Optical fibers and their relevant applications.

CO2 **Discuss** the basic principles of the Quantum Mechanics and its application in Quantum Computing.CO3 **Summarize** the essential properties of Dielectric superconductors and its applications in qubits.

CO4 **Illustrate** the application of physics in material sensing temperature resistance sensing materials.

CO5 **Practice** working in groups to conduct experiments in physics and **perform** precise and honest measurements

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Solid State Physics, S O Pillai, New Age International Private Limited, 8th Edition, 2018.
2. Engineering Physics by Gupta and Gour, Dhanpat Rai Publications, 2016 (Reprint).
3. A Textbook of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand. &Company Ltd, New Delhi.
4. Concepts of Modern Physics, Aurthur Beiser, McGrawhill, 6th Edition, 2009.
5. Lasers and Non Linear Optics, B B Loud, New age international, 2011 edition.
6. A Textbook of Engineering Physics by M.N. Avadhanulu, P G. Kshirsagar and T V S Arun Murthy, Eleventhedition, S Chand and Company Ltd. New Delhi-110055.
7. Quantum Computation and Quantum Information, Michael A. Nielsen & Isaac L. Chuang, Cambridge Universities

Press, 2010 Edition.

8. Quantum Computing, Vishal Sahani, McGraw Hill Education, 2007 Edition.
9. Quantum Computing – A Beginner's Introduction, Parag K Lala, Indian Edition, Mc GrawHill, Reprint 2020.
10. Engineering Physics, S P Basavaraj, 2005 Edition, Subhash Stores.
11. Physics for Animators, Michele Bousquet with Alejandro Garcia, CRC Press, Taylor & Francis, 2016.
12. Quantum Computation and Logic: How Quantum Computers Have Inspired Logical Investigations, Maria LuisaDalla Chiara, Roberto Giuntini, Roberto Leporini, Giuseppe Sergioli, Trendsin Logic, Volume 48, Springer.
13. Statistical Physics: Berkely Physics Course, Volume 5, F. Reif, McGraw Hill.

Introduction to Superconductivity, Michael Tinkham, McGraw Hill, INC, II Edition

Laboratory Component

Any Ten Experiments have to be completed from the list of experiments

Note: The experiments have to be classified into

a) Exercise
b) Demonstration
c) Structured Inquiry
d) Open Ended

Based on the convenience classify the following experiments into above categories. Select at least one simulation/spreadsheet activity.

List of Experiments

1. Determination of wavelength of LASER using Diffraction Grating.
2. Determination of acceptance angle and numerical aperture of the given Optical Fiber.
3. Determination of Magnetic Flux Density at any point along the axis of a circular coil.
4. Determination of resistivity of a semiconductor by Four Probe Method
5. Study the I-V Characteristics of the Given Bipolar Junction Transistor.
6. Determination of dielectric constant of the material of capacitor by Charging and Discharging method.
7. Study the Characteristics of a Photo-Diode and to determine the power responsivity / Verification of InverseSquare Law of Intensity of Light.
8. Study the frequency response of Series & Parallel LCR circuits.
9. Determination of Planck's Constant using LEDs.
10. Determination of Fermi Energy of Copper.
11. Identification of circuit elements in a Black Box and determination of values of the components.
12. Determination of Energy gap of the given Semiconductor.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Study of Application of Statistics using spread sheets
16. PHET Interactive
17. Determination od frequency of alternating current using sonometer
18. Interference at an Air wedge
19. Simulations(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)

Principles of Programming using C		
Subject code	**22POP13/23**	Credit: 03
Hours/Week:	2:0:2:0	SEE: 50 Marks
Total hours: 30	CIE: 50 Marks	SEE: 3 hours

Prerequisite: Nil

MODULES	Hours
Module-I **Algorithms, Flowcharts ,Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output :** Arithmetic operators, relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	6 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	6 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	6 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-functionprogram, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	6 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	6 hours

Text book:

1. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

1. Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017
2. Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.
3. Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.
4. Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs - 22POP13/23

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
    +       +
+       +       +
    +       +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even. ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers. iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same. ii) Read float elements and display the same. iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

Write and execute the following programs in C to demonstrate decision making using simple if - else and switch statements.

1. Simulation of a Simple Calculator.

2. Compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages.

3. An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs.100 as meter charge. If the total amount is more than Rs 400, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges.

Write and execute the following program in C using looping statements (while, do – while and for).

4. Write a C Program to display the following by reading the number of rows as input,

```
                1
            1   2   1
        1   2   3   2   1
    1   2   3   4   3   2   1
    ---------------------------
```

n^{th} row. **Write and execute the following programs in C using arrays.**

5. Implement Binary Search on Integers.

6. Sort the given set of N numbers using Bubble sort.

7. Implement Matrix multiplication and validate the rules of multiplication.

Write and execute the following programs in C using user defined functions.

8. Compute sin(x)/cos(x) using Taylor series approximation. Compare your result with the built-in library function. Print both the results with appropriate inferences.

9. Write functions to implement string operations such as compare, concatenate, and find string length. Use the parameter passing techniques.

Write and execute the following program in C using Structure.

10. Implement structures to read, write and compute average- marks of the students, list the students scoring above and below the average marks for a class of N students.

Write and execute the following program in C using pointers.

11. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.

Write and execute the following programs in C using file operations.

12. Write a C program to copy a text file to another, read both the input file name and target file name.

INTRODUCTION TO ELECTRONICS ENGINEERING			
Subject Code	22ECSC143/243	22BEE13/23	CIE: 50
Number of Lecture Hours/Week	3 (Theory) CREDITS- 3		SEE: 50
Total Number of LectureHours	40		SEE Hours: 03

Module#	Teaching Hours
Module-1	**08 Hours**
Power Supplies: Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators,Output resistance and voltage regulation, Voltage multipliers. **Amplifiers:** CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes.	
Module-2	**08 Hours**
Operational amplifiers: Ideal op-amp; characteristics of ideal and practical op-amp. **Practical op-amp circuits:** Inverting and non-inverting amplifiers, voltage follower, summer, subtractor,integrator, differentiator. **Oscillators:** Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator (using op-amp), Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)	
Module-3	**08 Hours**
Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates **Combinational logic:** Introduction, Design procedure, Adders- Half adder, Full adder.	
Module-4	**08 Hours**
Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC **Sensors and Interfacing:** Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display.	
Module-5	**08 Hours**
Analog Communication Schemes: Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky) **Digital Modulation Schemes:** Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.	

Communicative English		
Subject code	**22ENG16**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

MODULES	TeachingHours
Module-I **Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	3 hours
Module-II **Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants andvowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	3 hours
Module-III **Basic English Communicative Grammar and Vocabulary PART - I :**Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words,Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	3 hours
Module -IV **Basic English Communicative Grammar and Vocabulary PART - II:**Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence ofTenses (Rules in use of Tenses) and Exercises on it.	3 hours
Module-V **Communication Skills for Employment :**Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises. **Self-learning: Abrasives**: Introduction, classification, properties and application of silicon carbide (carborandum).	3 hours

Text book:

5) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
6) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference books:

11. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
12. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
13. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
14. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
15. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

Course outcome (Course Skill Set)

At the end of the course Communicative English (22ENG16) the student will be able to:

CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KSK17 / 27	**SAMSKRUTHIKA KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 - 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22KSK17/27) will enable the students,

1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸಿವುದು.
3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)

1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ
2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ
3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ. ವಿ. ಕೇಶವಮೂರ್ತಿ

ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)

1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.
2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು
   ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು
3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಅಯ್ದ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)

1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್
2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ

ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)

1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

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

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

Pattern of question paper

1. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KBK17 / 27	**BALAKE KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 – 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22K**B**K17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Module - 1 **(03 hours of pedagogy)**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2	(03 hours of pedagogy)
1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - **Possessive forms of nouns, dubitive question and Relative nouns** 2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು **Qualitative, Quantitative and Colour Adjectives, Numerals** 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –**Predictive Forms, Locative Case**	
Module - 3	**(03 hours of pedagogy)**
1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - **Dative Cases, and Numerals** 2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು **-Ordinal numerals and Plural markers** 3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –**Defective/Negative Verbs & Colour Adjectives**	
Module- 4	**(03 hours of pedagogy)**
1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು **Permission, Commands, encouraging and Urging words (Imperative words and sentences)** 2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು **Accusative Cases and Potential Forms used in General Communication** 3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs 4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words	
Module - 5	**(03 hours of pedagogy)**
1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs 2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms 3. **Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation**	

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Pattern of question paper

3. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

INNOVATION and DESIGN THINKING			
Subject code	**21IDT18/28**	Credit: 01	
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks	
Total hours: 25	CIE: 50 Marks	SEE: 2 hours	

MODULES		Hours
Module-I **PROCESS OF DESIGN** **Understanding Design thinking** Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping		
Teaching-Learning Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
Module-II **Tools for Design Thinking** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design		
Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-III **Design Thinking in IT** Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenariobased Prototyping		
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module -IV **DT For strategic innovations** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.		
Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-V Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		
Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

Text book:

9. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.
10. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.
11. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
12. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.

Reference books:

5. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
6. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

Course outcome (Course Skill Set)

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

CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through differenttechnique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

Course Title: **Mathematics-II for Computer Science and Engineering stream**

[As per Choice Based Credit System (CBCS) scheme]

(From the academic year 2022-23)

Course Code	22MATS21	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	40 hours Theory +10 or 12 Lab slots	Exam Hours	03

Module-1 Vector Calculus (6L+3T)

Introduction to Vector Calculus in Computer Science & Engineering.

Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.

Curvilinear coordinates: Scale factors, base vectors, Cylindrical polar coordinates, Spherical polar coordinates, transformation between cartesian and curvilinear systems, orthogonality. Problems.

Self-Study: Volume integral.

Applications: Conservation of laws, Electrostatics, Analysis of streamlines.**(RBT Levels: L1,L2 and L3)**

Module-2 Ordinary Differential Equations of higher order (6L+3T)

Importance of higher-order ordinary differential equations in Computer Science & Engineering applications.

Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations - Problems.

Self-Study: Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients. **Applications:**.**(RBT Levels: L1, L2 and L3)**

Module-3 Vector Space and Linear Transformations (6L+2T)

Importance of Vector Space and Linear Transformations in the field of Computer Science & Engineering.

Vector spaces: Definition and examples, subspace, linear span, Linearly independent and dependent sets, Basis and dimension. Problems.

Linear transformations: Definition and examples, Algebra of transformations, Matrix of a linear transformation. Change of coordinates, Rank and nullity of a linear operator, rank-nullity theorem. Inner product spaces and orthogonality. Problems.

Self-study: Angles and Projections. Rotation, reflection, contraction and expansion.

Applications: Image processing, AI & ML, Graphs and networks, computer graphics.**(RBT Levels: L1, L2 and L3)**

Module-4 Numerical methods -1 (5L+3T)

Importance of numerical methods for discrete data in the field of computer science & engineering.

Solution of algebraic and transcendental equations - Regula-Falsi and Newton-Raphson methods (only formulae). Problems.

Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.

Numerical integration: Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof). Problems.

S**elf-Study:** Bisection method, Lagrange's inverse Interpolation.

Applications: Estimating the approximate roots, extremum values, Area, volume, and surface area. Errors in finite precision.**(RBT Levels: L1, L2 and L3)**

Module-5 Numerical methods -2 (5L+3T)

Introduction to various numerical techniques for handling Computer Science & Engineering applications.

Numerical Solution of Ordinary Differential Equations (ODE's): Numerical solution of ordinary differential equations of first order and first degree – Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor-corrector formula (No derivations of formulae). Problems.

Self-Study: Adam-Bashforth method.

Applications: Estimating the approximate solutions of ODE.**(RBT Levels: L1, L2 and L3)**

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding gradient, divergent, curl and their geometrical interpretation
2	Verification of Green's theorem
3	Solutions of Second-order ordinary differential equations with initial/boundary

	conditions
4	Computation of basis and dimension for a vector space and Graphical representation of linear transformation
5	Visualization in time and frequency domain of standard functions
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7	Interpolation/Extrapolation using Newton's forward and backward difference formula
8	Computation of area under the curve using Trapezoidal, Simpson's (1/3)rd and (3/8)th rule
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
10	Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Semester End Examination (SEE):

Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

Course outcome (Course Skill Set)

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

CO 1	Understand the applications of vector calculus refer to solenoidal, and irrotational vectors. Orthogonal curvilinear coordinates
CO 2	Analyze the solution of higher order ordinary differential equations..
CO 3	Demonstrate the idea of Linear dependence and independence of sets in the vector space and linear transformation
CO 4	Apply the knowledge of numerical methods in analysing the discrete data and solving the physical and engineering problems.
CO 5	Get familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB /PYTHON/ SCILAB

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics"S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:**"Linear Algebra with applications.Jones Bartlett Publishers Inc.6th Ed., 2017.

Course Title:	Chemistry for Computer Science &Engineering stream		
Course Code:	**22CHES12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)[1]	2:2:2:0	ExamHours	03+02
Total Hours of Pedagogy	40 hours Theory + 10 to12 Lab slots	Credits	04

MODULE 1: Sensors and Energy Systems (8hr)

Sensors: Introduction, working principle and applications of Conductometric sensors, Electrochemical sensors, Thermometric sensors, and Optical sensors. Sensors for the measurement of dissolved oxygen (DO). Electrochemical sensors for the pharmaceuticals, surfactants, hydrocarbons. Electrochemical gas sensors for SOx and NOx. Disposable sensors in the detection of biomolecules and pesticides.

Energy Systems: Introduction to batteries, construction, working and applications of Lithium ion and Sodium ion batteries. Quantum Dot Sensitized Solar Cells (QDSSC's)- Principle, Properties and Applications.

Self-learning: Types of electrochemical sensor, Gas sensor - O_2 sensor, Biosensor - Glucosesensors.

MODULE 2: **Materials for Memory and Display Systems (8hr)**

Memory Devices: Introduction, Basic concepts of electronic memory, History of organic/polymer electronic memory devices, Classification of electronic memory devices, types of organic memory devices (organic molecules, polymeric materials, organic- inorganic hybrid materials).

Display Systems: Photoactive and electroactive materials, Nanomaterials and organic materials used in optoelectronic devices. Liquid crystals (LC's) - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's) and Quantum Light Emitting Diodes (QLED's), Lightemitting electrochemical cells.

Self-learning: Properties and functions of Silicon (Si), Germanium (Ge), Copper (Cu), Aluminium (Al), and Brominated flame retardants in computers.

MODULE 3: Corrosion and Electrode System (8hr)

Corrosion Chemistry: Introduction, electrochemical theory of corrosion, types of corrosion-differential metal and differential aeration. Corrosion control - galvanization, anodization and sacrificial anode method. Corrosion Penetration Rate (CPR) - Introduction and numerical problem.

Electrode System: Introduction, types of electrodes. Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode - Introduction, calomel electrode – construction, working and applications of calomel electrode. Concentration cell– Definition, construction and Numerical problems.

Analytical Techniques: Introduction, principle and instrumentation of Conductometry; its application in the estimation of weak acid. Potentiometry; its application in the estimation of iron.

Self-learning: IR and UV- Visible spectroscopy.

MODULE 4: Polymers and Green Fuels (8hr)

Polymers: Introduction, Molecular weight - Number average, weight average and numerical problems. Conducting polymers – synthesis and conducting mechanism of polyacetylene and commercial applications. Preparation, properties, and commercial applications of graphene oxide.

Green Fuels: Introduction, construction and working of solar photovoltaic cell, advantages, and disadvantages. Generation of energy (green hydrogen) by electrolysis of water and its advantages.

Self-learning: Regenerative fuel cells

MODULE 5: E-Waste Management (8hr)

E-Waste: Introduction, sources of e-waste, Composition, Characteristics, and Need of e- waste management. Toxic materials used in manufacturing electronic and electrical products, health hazards due to exposure to e-waste. Recycling and Recovery: Different approaches of recycling (separation, thermal treatments, hydrometallurgical extraction, pyrometallurgical methods, direct recycling). Extraction of gold from E-waste. Role of stake holders in environmental management of e-waste (producers, consumers, recyclers, and statutory bodies).

Self-learning: Impact of heavy metals on environment and human health.

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:

A1. Chemical Structure drawing using software: ChemDraw or ACD/ChemSketch

A2. Determination of strength of an acid in Pb-acid batteryA3: Synthesis of Iron-oxide Nanoparticles

A4. Electrolysis of water

B – Exercise (compulsorily any 4 to be conducted):

B1. Conductometric estimation of acid mixture
B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$
B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss methodB5. Estimation of total hardness of water by EDTA method

C – Structured Enquiry (compulsorily any 4 to be conducted):

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)
C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method C4. Estimation of Sodium present in soil/effluent sample using flame photometry
C5. Determination of Chemical Oxygen Demand (COD) of industrial waste water sample

D – Open Ended Experiments (any two):

D1: Evaluation of acid content in beverages by using pH sensors and simulation.D2. Construction of photovoltaic cell.
D3. Design an experiment to Identify the presence of proteins in given sample.
D4. Searching suitable PDB file and target for molecular docking

CO1. Identify the terms andapplications processes involved in scientific and engineering
CO2. Explain the phenomena of chemistry to describe the methods of engineeringprocesses
CO3. Solve for the problems in chemistry that are pertinent in engineering applications
CO4. Apply the basic concepts of chemistry to explain the chemical properties andprocesses
CO5. Analyze properties and multidisciplinary situations processes associated with chemical substances in

Suggested Learning Resources:
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
3. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
4. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
5. Engineering Chemistry – I, D. Grour Krishana, Vikas Publishing
6. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.
7. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2nd Edition, 2016.
8. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
9. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSCPublishing, 2005.
10. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
11. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
12. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley–Blackwell , 2012
13. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, ElzbietaFrackowiak, Wiley-VCH; 1st edition, 2013.
14. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESSPRESS Inc., 2017. Dr. H. Panda,
15. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
16. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: TheNational Academies Press. doi: 10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher,Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley& Sons, 2010
19. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, NiraliPrakashan, 2020
20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch SeventhEdition, Cengage Learning, 2020
21. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers,4th Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition,2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & PushpaIyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, FourthReprint, 2015.
28. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,
29. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Title:	**COMPUTER AIDED ENGINEERING DRAWING**		
Course Code	**22CED13/23**	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

Module-1

Introduction: ***for CIE only***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

Application on projections of Lines & Planes (For CIE only)

Module-2

Orthographic Projection of Solids:

Orthographic projection of right regular solids (**Solids Resting on HP only**): Prisms & Pyramids (square, pentagon, hexagon), Cylinders, Cones, Cubes .

Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).

Module-3

Isometric Projections:

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones andspheres. Isometric projection of combination of two simple solids.

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components.

Introduction to drawing views using 3D environment (For CIE only).

Module-4

Development of Lateral Surfaces of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Module-5

Multidisciplinary Applications & Practice ***(For CIE Only):***

Free hand Sketching; True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts todimensions etc

Electric Wiring and lighting diagrams; Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

Basic Building Drawing; Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges,trusses using Auto CAD or suitable software,

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts: Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or anysuitable software.

Course Outcomes

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

CO 1. Draw and communicate the objects with definite shape and dimensions

CO 2. Recognize and Draw the shape and size of objects through different views

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

Course Title: **INTRODUCTION TO ELECTRICAL ENGINEERING**		
Course Code	**22ESC142/242**	**CIE: 50**
Number of Lecture Hours/Week	**3hours (Theory)**	**SEE: 50**
Total Number of Lecture Hours	**40**	**SEE Hours: 03**

Modules	**Teaching Hours**
Module - I **Introduction:** Conventional and non-conventional energy resources; **Power Generation:** Hydel, Nuclear, Solar & wind power generation (Block Diagram approach). **Electromagnetism:** Faraday Laws of Electromagnetic Induction, Fleming's rules, Lenz's law, types of EMF and numerical.	**8hrs**
Module - II **A.C. Fundamentals:** Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical). **Three Phase Circuits:** Advantages, three phase connections (Star & Delta) (Excluding Derivations).	**8hrs**
Module - III **DC Machines: DC Generator**: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical. **DC Motor:** Principle of operation, back emf and its significance. Torque equation, types of motors, Applications of DC motors. Simple numerical. 3-point starter.	**8hrs**
Module - IV **Transformers:** Necessity of transformer, principle of operation, Types and construction of singlephase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical. Three-phase induction **Motors:** Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance simple numerical.	**8hrs**
Module – V **Domestic Wiring:** Requirements, Types of wiring: casing, capping. Two way and three way control of load. **Electricity Bill**: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. **Equipment Safety measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. **Personal safety measures:** Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	**8hrs**

Question paper pattern: Total ten questions will be asked,two from each module. The student has to answer five questions, selecting at least one from each module.

Reference books:

1. J P Tiwari," Basic Electrical Engineering", New age Publications, 2nd edition, 2011.
2. Rajendra Prasad "Fundamentals of Electrical Engineering", PHI 3rd edition, 2014.
3. B L Theraja& A K Theraja" Electrical Technology", Vol 1 , 2nd edition.
4. B L Theraja& A K Theraja" ABC of Electrical Engineering", 2nd edition.
5. D.P. Kothari and Nagrath "Theory and Problems in electrical Engineering", PHI edition 2011.
6. V. N. Mittal and Arvind Mittal;, " Basic Electrical Engineering" McGraw Hill.
7. R.V. Srinivasa Murthy "Basic Electrical Engineering" Sanguine Technical Publisher2004.

Course outcomes: On completion of the course, the student will have the ability to:

Course Code	**CO's**	**Course Outcome (CO)**
22ESC142/ 242	**CO1**	Understand the concepts of various energy sources and Electric circuits.
	CO2	Apply the basic Electrical laws to solve circuits.
	CO3	Discuss the construction and operation of various Electrical Machines.
	CO4	Identify suitable Electrical machine for practical implementation.
	CO5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.

Professional Writing Skills in English		
Subject code	**22PWS16/26**	Credit: 0
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 .5hours

MODULES	TeachingHours
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	3 hours
Module-II **Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction andConclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	3 hours
Module-III **Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error& Sentence Improvement, Cloze Test and Theme Detection Exercises.	3 hours
Module -IV **Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	3 hours
Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and itsimportance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	3 hours

Text book:

5) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
6) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].

Reference books:

11) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
12) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
13) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
14) **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
15) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

Course outcome (Course Skill Set)

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills.
CO5	To learn about Techniques of Information Transfer through presentation in different level.

Indian Constitution		
Subject code	**22ICO17/27**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1. hours

MODULES	**TeachingHours**
Module-I Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	3 hours
Module-II Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.	3 hours
Module-III Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	3 hours
Module -IV Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	3 hours
Module-V State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3 hours

Text book:

1. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**):Prentice –Hall, 2008.

Reference books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

Course outcome (Course Skill Set)

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

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Scientific Foundations of Health		
Subject code	**22SFH18/28**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.	3 hours
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components forhealth, Wellness and physical function, How to avoid exercise injuries.	3 hours
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.	3 hours
Module -IV **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictivepeople and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.	3 hours
Module-V **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.	3 hours

Text book:

7. **"Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU-University Website.**
8. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
9. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference books:

9. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
10. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles,McGraw Hill Education (India) Private Limited - Open University Press.
11. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
12. **Scientific Foundations of Health (Health & Welness) - General Books** published for university andcolleges references by popular authors and published by the reputed publisher.

Course outcome (Course Skill Set)

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

P.D.A College of Engineering Kalaburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE)and Choice Based Credit System (CBCS) (Effective from the academic year 2022-23)

I Semester (Electronics and Communication Engineering & EIE) (Chemistry Group)

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				
					Theory	Tutorial	Practical/	SDA	Duration in	CIEMarks	SEEMarks	TotalMarks	
					L	T	P	S					
1	ASC(IC)	22MATE11	Mathematics for EEE Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHEE12	Chemistry for EEE Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED13	Computer-Aided Engineering Drawing	Respective Dept.	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC145	Introduction to C Programming	Respective EnggDept	3	0	0	0	03	50	50	100	03
5	ETC-I	22ETC15X	Emerging Technology Courses	Any dept	3	0	0	0	03	50	50	100	03
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMS	22ICO17/27	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	22SFH18	Scientific Foundations of Health	AnyDept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

P.D.A College of Engineering Kalburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education(OBE)and Choice Based Credit System(CBCS) (Effective from the academic year 2022-23)

II Semester (Electronics and Communication Engineering) & EIE (Physics Group)

Sl. No	Course and Course Code		Course Tile	TD/PSB	Teaching Hours/Week				Examination				
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P	S					
1	ASC(IC)	22MATC21	Mathematics for EEE stream-II	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYE22	Physics for EEE Stream	PHY	2	2	2	0	03	50	50	100	04
3	ESC	22BEE13	Introduction to Electronics engineering	Electric Engg. Dept.	2	2	0	0	03	50	50	100	03
4	ESC-I	22ESC244	Introduction to Mechanical Engineering	Respective Engg dept	3	0	0	0	03	50	50	100	03
5.	PLC-I	22PLC25X	Programming Language Courses-I&II		2	0	2	0	03	50	50	100	03
6	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	1.5	50	50	100	01
8	AEC/SDC	22IDT28	Innovation and Design Thinking	Any Dept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

Course Title: **Mathematics-I for Electrical and Electronics Engineering stream**

[As per Choice Based Credit System (CBCS) scheme]

(From the academic year 2022-23)

Course Code	**22MATE11**	**CIE Marks**	**50**
Credits	**04**	**SEE Marks**	**50**
Course Type	**Integrated**		
Contact Hours/Week (L-T-P)	**2-2-2**	**Total Marks**	**100**
Contact Hours of Pedagogy	**42 hours Theory +10 Lab slots**	**Exam Hours**	**03**

Module-1 Calculus (5L+3T)

Introduction to polar coordinates and curvature relating to EC&EE engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, and angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems.

Self-study: Center and circle of curvature, evolutes and involutes.

Applications: Communication signals, Manufacturing of microphones, and Image processing.

(RBT Levels: L1, L2 and L3)

Module-2 Series Expansion and Multivariable Calculus (6L+2T)

Introduction to series expansion and partial differentiation in the field of EC&EE engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms : L-Hospital's rule, problems.

Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables – Simple Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

Applications: Series expansion in communication signals, Errors and approximations**.**

(RBT Levels: L1, L2 and L3)

Module-3 Ordinary Differential Equations (ODEs) (6L+3T)

Introduction to first-order ordinary differential equations pertaining to the applications for EC&EE engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$

Orthogonal trajectories, L-R and C-R circuits.Problems.

Importance of higher-order ordinary differential equations in EC&EE Engineering applications.

Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters.

Self-Study: Applications of ODEs in EC&EE Engineering field. Cauchy's and Legendre's homogeneous differential equations - Problems.

Applications of ordinary differential equations: Rate of Growth or Decay, **(RBT Levels: L1, L2 and L3)**

Module-4 Integral Calculus (6L+3T)

Introduction to Integral Calculus in EC&EE Engineering applications.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions. Problems.

Self-Study: Volume by triple integration, Center of gravity.

Applications: Antenna and wave propagation, Calculation of optimum power in electrical circuits, field theory

(RBT Levels: L1, L2 and L3)

Module-5 Linear Algebra (5L+3T)

Introduction of linear algebra related to EC&EE Engineering applications.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector.

Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications of Linear Algebra: Network Analysis, Critical point of a network system. Optimum solution.
(RBT Levels: L1, L2 and L3)

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs / Solutions of Second-order ordinary differential equations with initial/boundaryconditions
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigenvectors and find the largest and smallest eigen value by Rayleigh power method

Suggested software's: Mathematica/MatLab/Python/Scilab

Semester End Examination (SEE):

Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

Course outcome (Course Skill Set)

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

CO 1	Apply the knowledge of calculus to solve problems related to polar curves
CO 2	Learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 3	Analyze the solution of first and higher order ordinary differential equations
CO 4	Apply the knowledge of multiple integrals to compute area and volume.
CO 5	Make use of matrix theory for solving for system of linear equations and compute eigen values and eigen vectors. Familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	Chemistry for Electrical and ElectronicsEngineering stream		
Course Code:	**22CHEE12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)[1]	2:2:2:0	ExamHours	03+02
Total Hours of Pedagogy	40 hours Theory + 10to12 Lab slots	Credits	04

MODULE 1: Chemistry of Polymers and Electronic Materials (8hr)

Polymers: Introduction, types of polymerization, free radical mechanism of addition polymerization, techniques of addition polymerization, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC) and polystyrene.
Conducting polymers – synthesis and conducting mechanism of Polyacetylene
Fibers: Introduction, synthesis, properties and industrial applications of Kevlar and Polyester.
Plastics: Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon.
Self-learning: Biodegradable polymer: Introduction, synthesis, properties and applications of polylactic acid (PLA).

MODULE 2: Energy Conversion and Storage (8hr)

Batteries: Introduction, classification of batteries. Components, construction, working and applications of modern batteries; Na-ion battery, Zn-air, Ni-MH, solid state battery (Li-polymer battery) and Li-ion battery.
Fuel Cells: Introduction, construction, working and applications of methanol–oxygen and Polymer electrolyte membrane (PEM) fuel cell.
Chemical Fuels: Introduction, calorific value, determination of calorific value using bombcalorimeter, numerical problems on GCV and NCV.
Self-learning: Electrodes for electrostatic double layer capacitors, pseudo capacitors, and Hybrid capacitor.

MODULE 3: Corrosion Science and E-waste Management (8hr)

Corrosion Chemistry: Introduction, electrochemical theory of corrosion, types of corrosion-differential metal and differential aeration. Corrosion control - galvanization, anodization and sacrificial anode method. Factors affecting corrosion (EMF, Temperature, pH, relative area of anode and cathode and polarization).
E-waste Management: Introduction, sources, types, effects of e-waste on environment and human health, methods of disposal, advantages of recycling. Extraction of gold from E-waste.
PCB: Electroless plating – Introduction, Electroless plating of copper in the manufacture of PCB.
Self-learning: Recycling of PCB and battery components

Module-4: Water technology and Nanotechnology (8 hr)

Water technology: Introduction, sources and nature of impurities of water, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by Lime-Soda Process, determination of COD, numerical problems. Purification of water by Reverse osmosis and chlorination methods.
Nanotechnology: Introduction, properties and engineering application of carbon nanotubes, graphene and nanomaterials for water treatment(metal oxide).
Self-learning: Introduction, classification, properties and application of silicon carbide.

MODULE 5: Electrode System in Analytical Techniques (8hr)

Electrode System: Introduction, types of electrodes. Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode - Introduction, calomel electrode – construction, working and applications of calomel electrode. Concentration cell – Definition, construction and Numerical problems.
Analytical Techniques: Introduction, principle and instrumentation of Colorimetric sensors; its application in the estimation of copper, Potentiometric sensors; its application in the estimation of iron, Conductometric sensors; its application in the estimation of weak acid.
Self-learning: IR and UV- Visible spectroscopy.

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:
A1. Synthesis of polyurethane
A2. Determination of strength of an acid in Pb-acid batteryA3. Synthesis of iron oxide nanoparticles
A4. Electroplating of copper on metallic objects
B – Exercise (compulsorily any 4 to be conducted):
B1.Conductometric estimation of acid mixture

B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$
B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss methodB5.Estimation of total hardness of water by EDTA method

C – Structured Enquiry (compulsorily any 4 to be conducted):

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)
C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method C4. Estimation of Sodium present in soil/effluent sample using flame photometry
C5. Determination of Chemical Oxygen Demand(COD) of industrial waste water sample

D – Open Ended Experiments (any two):

D1. Estimation of metal in e-waste by optical sensorsD2. Electroless plating of Nickle on Copper
D3. Determination of glucose by electrochemical sensors
D4. Synthesis of polyaniline and its conductivity measurement

CO1. Identify the terms andapplications processes involved in scientific and engineering
CO2. Explain the phenomena of chemistry to describe the methods of engineering processes
CO3. Solve for the problems in chemistry that are pertinent in engineering applications
CO4. Apply the basic concepts of chemistry to explain the chemical properties andprocesses
CO5. Analyze properties and multidisciplinary situations processes associated with chemical substances in

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. Engineering Chemistry, Satyaprakash& Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. GrourKrishana, Vikas Publishing
7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd.,12thEdition, 2011.
8. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2nd Edition, 2016.
9. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin& A.C. Arsenault, RSCPublishing, 2005.
11. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
12. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
13. OLED Display Fundamentals and Applications, TakatoshiTsujimura, Wiley–Blackwell , 2012
14. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, ElzbietaFrackowiak, Wiley-VCH; 1st edition, 2013.
15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESSPRESS Inc., 2017. Dr. H. Panda,
16. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: TheNational Academies Press. doi: 10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher,Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley& Sons, 2010
19. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, NiraliPrakashan, 2020
20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch SeventhEdition, Cengage Learning, 2020
21. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers,4th Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition,2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition 2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah& PushpaIyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, FourthReprint, 2015.
28. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,

Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Title:	**COMPUTER AIDED ENGINEERING DRAWING**		
Course Code	**22CED13/23**	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

Module-1

Introduction: ***for CIE only***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

Application on projections of Lines & Planes (For CIE only)

Module-2

Orthographic Projection of Solids:

Orthographic projection of right regular solids (**Solids Resting on HP only**): Prisms & Pyramids (square, pentagon, hexagon), Cylinders, Cones, Cubes .

Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).

Module-3

Isometric Projections:

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones andspheres. Isometric projection of combination of two simple solids.

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components.

Introduction to drawing views using 3D environment (For CIE only).

Module-4

Development of Lateral Surfaces of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Module-5

Multidisciplinary Applications & Practice ***(For CIE Only):***

Free hand Sketching; True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts todimensions etc

Electric Wiring and lighting diagrams; Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

Basic Building Drawing; Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges,trusses using Auto CAD or suitable software,

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts: Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or anysuitable software.

Course Outcomes

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

CO 1. Draw and communicate the objects with definite shape and dimensions

CO 2. Recognize and Draw the shape and size of objects through different views

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

Course Title:	Introduction to C Programming		
Course Code:	**22ESC145/245**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	TeachingHours
Module-I **Algorithms, Flowcharts, Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output:** Arithmetic operators,relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	8 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	8 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	8 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	8 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	8 hours

Text book:

3. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

4. Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017
5. Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.
6. Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.
7. Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs – 22ESC145/245

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
      +   +
    +   +   +
      +   +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even.

ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers.

iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same.

ii) Read float elements and display the same.

iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

21. C Program to find Mechanical Energy of a particle using $E = mgh+1/2\ mv^2$.
22. C Program to convert Kilometers into Meters and Centimeters.
23. C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
24. Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
25. Implement Matrix multiplication and validate the rules of multiplication.
26. Compute sin(x)/cos(x) using Taylor series approximation. Compare you result with the built-in library function. Print both the results with appropriate inferences.
27. Sort the given set of N numbers using Bubblesort.
28. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
29. Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
30. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers

Communicative English		
Subject code	**22ENG16**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

MODULES	TeachingHours
Module-I **Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	3 hours
Module-II **Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants andvowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	3 hours
Module-III **Basic English Communicative Grammar and Vocabulary PART - I :**Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words,Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	3 hours
Module -IV **Basic English Communicative Grammar and Vocabulary PART - II:**Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence ofTenses (Rules in use of Tenses) and Exercises on it.	3 hours
Module-V **Communication Skills for Employment :**Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises. **Self-learning: Abrasives**: Introduction, classification, properties and application of silicon carbide (carborandum).	3 hours

Text book:

7) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
8) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference books:

16. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
17. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
18. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
19. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
20. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

Course outcome (Course Skill Set)

At the end of the course Communicative English (22ENG16) the student will be able to:

CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation.

Indian Constitution		
Subject code	**22ICO17/27**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	3 hours
Module-II Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.	3 hours
Module-III Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	3 hours
Module -IV Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	3 hours
Module-V State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3 hours

Text book:

5. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
6. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

Reference books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

Course outcome (Course Skill Set)

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

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Scientific Foundations of Health		
Subject code	**22SFH18/28**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.	3 hours
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components forhealth, Wellness and physical function, How to avoid exercise injuries.	3 hours
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.	3 hours
Module -IV **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictivepeople and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.	3 hours
Module-V **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.	3 hours

Text book:

10. **"Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU-University Website.**
11. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
12. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference books:

13. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
14. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles,McGraw Hill Education (India) Private Limited - Open University Press.
15. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
16. **Scientific Foundations of Health (Health & Welness) - General Books** published for university andcolleges references by popular authors and published by the reputed publisher.

Course outcome (Course Skill Set)

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

Course Title: **Mathematics-II for Electrical & Electronics Engineering stream**

[As per Choice Based Credit System (CBCS) scheme]

(From the academic year 2022-23)

Course Code	22MATE21	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory +10 Lab slots	Exam Hours	03

Course objectives: The goal of the course **Mathematics-II for Electrical & Electronics Engineering stream** (**22MATE21**) is to

- **Familiarize** the importance of Integral calculus and Vector calculus essential for electronics and electrical engineering.
- **Analyze** electronics and electrical engineering problems by applying Partial Differential Equations.
- **Develop** the knowledge of solving electronics and electrical engineering problems numerically.

Module-1 Vector Calculus (6L+3T)

Introduction to Vector Calculus in EC&EE Engineering applications.

Vector Differentiation: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.

Vector Integration: Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stoke's theorem. Problems.

Self-Study: Volume integral and Gauss divergence theorem.

Applications: Conservation of laws, Electrostatics, Analysis of streamlines and electric potentials.

(RBT Levels: L1, L2 and L3)

Module-2 Vector Space and Linear Transformations (6L+2T)

Importance of Vector Space and Linear Transformations in the field of EC & EE engineering applications.

Vector spaces: Definition and examples, subspace, linear span, Linearly independent and dependent sets, Basis and dimension.

Linear transformations: Definition and examples, Algebra of transformations, Matrix of a linear transformation. Change of coordinates, Rank and nullity of a linear operator, Rank-Nullity theorem. Inner product spaces and orthogonality.

Self-study: Angles and Projections. Rotation, reflection, contraction and expansion.

Applications: Image processing, AI & ML, Graphs and networks, computer graphics.

(RBT Levels: L1, L2 and L3)

Module-3 Laplace Transform (6L+3T)

Importance of Laplace Transform for EC & EE engineering applications.

Existence and Uniqueness of Laplace transform (LT), transform of elementary functions, region of convergence, Properties–Linearity, Scaling, t-shift property, s-domain shift, differentiation in the s-domain, division by t, differentiation and integration in the time domain, LT of special functions-periodic functions (square wave, saw-tooth wave, triangular wave, full & half wave rectifier), Heaviside Unit step function, Unit impulse function.

Inverse Laplace Transforms:

Definition, properties, evaluation using different methods, convolution theorem (without proof), problems, and Applications to solve ordinary differential equations.

Self-Study: Verification of convolution theorem.

Applications: Signals and systems, Control systems, LR, CR & LCR circuits.**(RBT Levels: L1, L2 and L3)**

Module-4 Numerical methods -1 (5L+3T)

Importance of numerical methods for discrete data in the field of EC & EE engineering applications.

Solution of algebraic and transcendental equations: Regula-Falsi method and Newton-Raphson method (only formulae). Problems.

Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.

N**umerical integration**: Trapezoidal, Simpson's $(1/3)_{rd}$ and $(3/8)_{th}$ rules (without proof). Problems.

S**elf-Study:** Bisection method, Lagrange's inverse Interpolation, Weddle's rule.

Applications: Estimating the approximate roots, extremum values, Area,volume and surface area.

(RBT Levels: L1, L2 and L3)

Module-5 Numerical methods -2 (5L+3T)

Introduction to various numerical techniques for handling EC & EE applications.

Numerical Solution of Ordinary Differential Equations (ODEs):

Numerical solution of ordinary differential equations of first order and first degree – Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor corrector formula (No derivations of formulae). Problems.

Self-Study: Adam-Bashforth method.

Applications: Estimating the approximate solutions of ODE for electric circuits.

(RBT Levels: L1, L2 and L3

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding gradient, divergent, curl and their geometrical interpretation and Verification of Green's theorem
2	Computation of basis and dimension for a vector space and Graphical representation of linear transformation
3	Visualization in time and frequency domain of standard functions
4	Computing inverse Laplace transform of standard functions
5	Laplace transform of convolution of two functions
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7	Interpolation/Extrapolation using Newton's forward and backward difference formula
8	Computation of area under the curve using Trapezoidal, Simpson's $(1/3)_{rd}$ and $(3/8)_{th}$ rule
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
10	Solution of ODE of first order and first degree by Runge-Kutta 4_{th} order and Milne's predictor-corrector method

.

Suggested software's: Mathematica/MatLab/Python/Scilab

Semester End Examination (SEE):

Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a

maximum of 3 sub-questions), **should have a mix of topics** under that module.

3. The students have to answer 5 full questions, selecting one full question from each module.

Course outcome (Course Skill Set)

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

CO 1	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
CO 2	Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation
CO 3	To understand the concept of Laplace transform and to solve initial value problems.
CO 4	Apply the knowledge of numerical methods in solving physical and engineering phenomena
CO 5	Get familiarize with modern mathematical tools namely SCILAB/PYTHON/MATLAB

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw − Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	**Physics for ECE & EEE Stream**		
Course Code:	**22PHYE12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours+10-12 Lab Slots	Credits	04

Module-1 (08 Hours)

Quantum Mechanics:

de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus-Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation, Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Waveforms and Probabilities. Numerical Problems

Pre-requisite: Wave–Particle dualism

Self-learning: de Broglie Hypothesis

Module-2 (08 hours)

Electrical Properties of Solids:

Conductors:

Quantum Free Electron Theory of Metals: Assumptions, Fermi-energy, Fermi factor, Variation of Fermi Factor with Temperature and Energy, Mention of expression for electrical conductivity.

Dielectric Properties: Polar and non-polar dielectrics, Electrical Polarization Mechanisms, internal fields insolids, Clausius-Mossotti equation (Derivation), Solid, Liquid and Gaseous dielectrics. Application of dielectrics in transformers, Capacitors, Electrical Insulation. Numerical Problems.

Superconductivity:

Introduction to Superconductors, Temperature dependence of resistivity, Meissner Effect, Critical Field,Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), High Temperature superconductivity, SQUID, MAGLEV, Numerical problems.

Pre-requisites: Classical Free Electron Theory

Self-learning: Dielectrics Basics

Module-3 (08 hours)

Lasers and Optical Fibers:

Lasers: Characteristics of LASER, Interaction of radiation with matter, Expression for Energy Density and its significance. Requisites of a Laser System. Conditions for Laser action. Principle, Construction and Working of Carbon Dioxide Laser. Application of Lasers in Defense (Laser range finder) and Laser Printing. Numerical Problems

Optical Fibers: Total Internal Reflection**,** Propagation mechanism, Angle of Acceptance, Numerical Aperture, Fractional Index Change, Modes of Propagation, Number of Modes and V Number, Types of Optical Fibers. Attenuation and Mention of Expression for Attenuation coefficient, Attenuation Spectrum of an Optical Fiber with Optical Windows. Discussion of Block Diagram of Point to Point Communication, Intensity based Fiber Optic Displacement Sensor, Merits and Demerits, Numerical problems.

re-requisite: Properties of light

Self-learning: Total Internal Reflection

Module-4 (08 hours)

Maxwell's Equations and EM waves:

Maxwell's Equations: Fundamentals of Vector Calculus. Divergence and Curl of Electric field and Magnetic field (static), Gauss' divergence theorem and Stoke's theorem. Description of laws of Electrostatics, Magnetism, Faraday's laws of EMI, Current Density, Equation of Continuity, Displacement Current (with derivation), Maxwell's equations in vacuum, Numerical Problems

EM Waves: The wave equation in differential form in free space (Derivation of the equation using Maxwell's equations), Plane Electromagnetic Waves in vacuum, their transverse nature.

Pre-requisite: Electricity & Magnetism

Self-learning: Fundamentals of vector calculus.

Module-5 (08 hours)

Semiconductors and Devices:

Fermi level in Intrinsic & Extrinsic Semiconductor, Expression for concentration of electrons in conduction band & holes concentration in valance band (only mention the expression), Relation between Fermi energy & Energy gap in intrinsic semiconductors(derivation), Law of mass action, Electrical conductivity of a semiconductor (derivation), Hall effect, Expression for Hall coefficient (derivation) and its application. Photo-diode and Power responsivity, Construction and working of Semiconducting Laser, Four probe method to determine resistivity, Phototransistor, Numerical problems.

Pre-requisite: Basics of Semiconductors

Self-learning: Fermi level in Intrinsic & Extrinsic Semiconductor

CO1 Describe the fundamental principles of the Quantum Mechanics and the essentials of Photonics.

CO2Elucidate the concepts of conductors, dielectrics and superconductivity

CO3 Discuss the fundamentals of vector calculus and their applications in Maxwell's Equations and EM Waves.

CO4 Summarize the properties of semiconductors and the working principles of semiconductor devices.

CO5 Practice working in groups to conduct experiments in physics and **Perform** precise and honest measurements.

Laboratory Component:

Any Ten Experiments have to be completed from the list of experiments

Note: The experiments have to be classified into

a) Exercise
b) Demonstration
c) Structured Inquiry
d) Open Ended

Based on the convenience classify the following experiments into above categories selecting at least three experimentsfor each type. Select at least one simulation/spreadsheet activity.

List of Experiments

1. Determination of wavelength of LASER using Diffraction Grating.
2. Determination of acceptance angle and numerical aperture of the given Optical Fiber.
3. Determination of Magnetic Flux Density at any point along the axis of a circular coil.
4. Determination of resistivity of a semiconductor by Four Probe Method
5. Study the I-V Characteristics of the Given Bipolar Junction Transistor.
6. Determination of dielectric constant of the material of capacitor by Charging and Discharging method.
7. Study the Characteristics of a Photo-Diode and to determine the power responsivity / Verification ofInverse Square Law of Intensity of Light.
8. Study the frequency response of Series & Parallel LCR circuits.
9. Determination of Plank's Constant using LEDs.
10. Determination of Fermi Energy of Copper.
11. Identification of circuit elements in a Black Box and determination of values of the components.
12. Determination of Energy gap of the given Semiconductor.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Study of Application of Statistics using spread sheets
16. PHET Interactive
17. Determination of frequency of alternating current using Sonometer
18. Interference at an Air wedge

Simulations(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)

INTRODUCTION TO ELECTRONICS ENGINEERING			
Subject Code	22ECSC143/243	22BEE13/23	CIE: 50
Number of Lecture Hours/Week	3 (Theory)		SEE: 50
Total Number of Lecture Hours	40 CREDITS- 3		SEE Hours: 03

Module#	Hours
Module-1	**08 Hours**
Power Supplies: Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators,Output resistance and voltage regulation, Voltage multipliers. **Amplifiers:** CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes.	
Module-2	**08 Hours**
Operational amplifiers: Ideal op-amp; characteristics of ideal and practical op-amp. **Practical op-amp circuits:** Inverting and non-inverting amplifiers, voltage follower, summer, subtractor,integrator, differentiator. **Oscillators:** Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator (using op-amp), Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)	
Module-3	**08 Hours**
Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates **Combinational logic:** Introduction, Design procedure, Adders- Half adder, Full adder.	
Module-4	**08 Hours**
Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC **Sensors and Interfacing:** Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7- Segment LED Display.	
Module-5	**08 Hours**
Analog Communication Schemes: Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky) **Digital Modulation Schemes:** Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.	

Text books:

1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015. DOI https://doi.org/10.4324/9781315737980. eBook ISBN9781315737980 2nd
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-2030417-84.

D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India),PrivateLimited, 2018

CO1	Design basic power supply & study concept of amplifiers.
CO2	To analyze working of op-amp with its applications & to studyoscillators.
CO3	Develop competence knowledge to construct basic digital circuit by make use of basic gate and its function.
CO4	Understand the concept of embedded system. Study role of Sensor and its interfacing.
CO5	To study various analog and digital modulation and demodulationtechniques

Course Title:	**INTRODUCTION TO MECHANICAL ENGINEERING**		
Course Code:	22ESC144/244	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Module-1 (8 hours)

Introduction to Mechanical Engineering (Overview only):
Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Steam Formation and Application:
Modes of heat transfer, Steam formation, Types of steam, Steam properties and applications of steam (simple numerical problems).

Energy Sources and Power Plants:
Basic working principles of Hydel power plant, Thermal power plant, nuclear power plant, Solar power plant, Tidal power plant and Wind power plant.

Module-2 (8 hours)

Machine Tool Operations:
Lathe: Principle of working of a center lathe, lathe operations: Turning, facing, knurling, thread cutting, taper turning by swivelling the compound rest,
Drilling Machine: Working of simple drilling machine, drilling operations: drilling, boring, reaming, tapping, counter sinking, counter boring,
Milling Machine: Working and types of milling machine, milling operations: plane milling, end milling and slot milling.
(No sketches of machine tools, sketches to be used only for explaining the operations).
Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantages and applications of CNC, 3D printing.

Module-3 (8 hours)

Introduction to IC Engines: Components and working principles, 4-Stroke Petrol and Diesel engines, Application of IC Engines, performance of IC engines (Simple numerical).

Introduction to Refrigeration and Air Conditioning: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner & Applications of air Conditioners

Module-4 (8 hours)

Mechanical Power Transmission:
Gear Drives: Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)
Belt Drives: Introduction, Types of belt drives (Flat and V-Belt Drive), length of the belt and tensions ratio (simple numerical problems)
Joining Processes: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding, MIG welding and Fusionwelding.

Module-5 (8 hours)

Insight into future mobility technology; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.

Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing and assembly andinspection.

CO1 Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources

CO2 Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.
CO3 Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics
CO4 Determine the condition of steam and its energy, performance parameters of IC engines, velocity ratio and power transmitted through power transmission systems. CO5 Explain the Working Principle of EV vehicles and concepts of Mechatronics and Robotics
Suggested Learning Resources: **Test Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)** 8. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008 9. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, MediaPromotersand Publishers Pvt. Ltd., 2010. **Reference Books** An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012

Professional Writing Skills in English		
Subject code	**22PWS16/26**	Credit: 0
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 .5hours

MODULES	TeachingHours
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	3 hours
Module-II **Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction andConclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	3 hours
Module-III **Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error& Sentence Improvement, Cloze Test and Theme Detection Exercises.	3 hours
Module -IV **Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	3 hours
Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and itsimportance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	3 hours

Text book:

7) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
8) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].

Reference books:

16) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
17) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
18) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
19) **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
20) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

Course outcome (Course Skill Set)

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills.
CO5	To learn about Techniques of Information Transfer through presentation in different level.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KSK17 / 27	**SAMSKRUTHIKA KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 - 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22KSK17/27) will enable the students,

1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸಿವುದು.
3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)

1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ
2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ
3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ

ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)

1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.
2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು
   ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು
3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಅಯ್ದ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)

1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್
2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ

ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)

1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

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

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

Pattern of question paper

2. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KBK17 / 27	**BALAKE KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 – 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22K**B**K17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Module - 1 **(03 hours of pedagogy)**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2	(03 hours of pedagogy)
1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - **Possessive forms of nouns, dubitive question and Relative nouns** 2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು **Qualitative, Quantitative and Colour Adjectives, Numerals** 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –**Predictive Forms, Locative Case**	
Module - 3	**(03 hours of pedagogy)**
1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - **Dative Cases, and Numerals** 2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು **-Ordinal numerals and Plural markers** 3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –**Defective/Negative Verbs & Colour Adjectives**	
Module- 4	**(03 hours of pedagogy)**
1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು **Permission, Commands, encouraging and Urging words (Imperative words and sentences)** 2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು **Accusative Cases and Potential Forms used in General Communication** 3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs 4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words	
Module - 5	**(03 hours of pedagogy)**
1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs 2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms 3. **Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation**	

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Pattern of question paper

4. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

INNOVATION and DESIGN THINKING		
Subject code	21IDT18/28	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 25	CIE: 50 Marks	SEE: 2 hours

Prerequisite: Nil

Course objectives

- To explain the concept of design thinking for product and service development
- To explain the fundamental concept of innovation and design thinking
- To discuss the methods of implementing design thinking in the real world.

MODULES		Hours
Module-I **PROCESS OF DESIGN** **Understanding Design thinking** Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping		5
Teaching-Learning Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
Module-II **Tools for Design Thinking** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design		5
Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-III **Design Thinking in IT** Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenario based Prototyping		5
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module -IV **DT For strategic innovations** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.		5
Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-V Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		5
Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

Text book:

13. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.
14. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.
15. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
16. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.

Reference books:

7. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
8. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

Course outcome (Course Skill Set)

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

CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through differenttechnique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

P.D.A College of Engineering Kalaburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE)and Choice Based Credit System (CBCS) (Effective from the academic year 2022-23)

I Semester (EEE Engineering Stream) (Chemistry Group)

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				
					Theory	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIEMarks	SEEMarks	Total Ma	
					L	T	P	S					
1	ASC(IC)	22MATE11	Mathematics for EEE Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHEE12	Chemistry for EEE Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED13	Computer-Aided Engineering Drawing	Respective Dept.	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC145	Introduction to C Programming	Respective EnggDept	3	0	0	0	03	50	50	100	03
5	ETC-I	22ETC15X	Engineering Technology courses	EEE	3	0	0	0	03				
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMS	22ICO17/27	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	22SFH18	Scientific Foundations of Health	AnyDept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

P.D.A College of Engineering Kalburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education(OBE)and Choice Based Credit System(CBCS) (Effective from the academic year 2022-23)

II Semester (EEE Stream)) (Physics Group)

Sl. No	Course and CourseCode		CourseTitle	TD/PSB	Teaching Hours/Week				Examination				
					Theory	Tutorial	Practical/	SDA	Duration in	CIEMarks	SEEMarks	Total Ma	Credits
					L	T	P	S					
1	ASC(IC)	22MATE21	Mathematics for EEE stream-II	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYE22	Physics for EEE Stream	PHY	2	2	2	0	03	50	50	100	04
3	ESC	22EEE23	Elements of electrical engineering	Electric Engg. Dept.	2	2	0	0	03	50	50	100	03
4	ESC-I	22ESC243	Introduction to Electronic Engineering	Respective Engg dept	3	0	0	0	03	50	50	100	03
5.	PLC-I	22PLC25X	Programming Language Courses-I&II	Any dept	2	0	2	0	03	50	50	100	03
6	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	1.5	50	50	100	01
8	AEC/SDC	22IDT28	Innovation and Design Thinking	Any Dept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

Course Title: **Mathematics-I for Electrical and Electronics Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	**22MATE11**	**CIE Marks**	**50**
Credits	**04**	**SEE Marks**	**50**
Course Type	**Integrated**		
Contact Hours/Week (L-T-P)	**2-2-2**	**Total Marks**	**100**
Contact Hours of Pedagogy	**42 hours Theory +10 Lab slots**	**Exam Hours**	**03**

Module-1 Calculus (5L+3T)

Introduction to polar coordinates and curvature relating to EC&EE engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, and angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems.

Self-study: Center and circle of curvature, evolutes and involutes.

Applications: Communication signals, Manufacturing of microphones, and Image processing.

(RBT Levels: L1, L2 and L3)

Module-2 Series Expansion and Multivariable Calculus (6L+2T)

Introduction to series expansion and partial differentiation in the field of EC&EE engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms : L-Hospital's rule, problems.

Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables – Simple Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

Applications: Series expansion in communication signals, Errors and approximations.**(RBT Levels: L1, L2 and L3)**

Module-3 Ordinary Differential Equations (ODEs) (6L+3T)

Introduction to first-order ordinary differential equations pertaining to the applications for EC&EE engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$

Orthogonal trajectories, L-R and C-R circuits.Problems.

Importance of higher-order ordinary differential equations in EC&EE Engineering applications.

Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters.

Self-Study: Applications of ODEs in EC&EE Engineering field. Cauchy's and Legendre's homogeneous differential equations - Problems.

Applications of ordinary differential equations: Rate of Growth or Decay, **(RBT Levels: L1, L2 and L3)**

Module-4 Integral Calculus (6L+3T)

Introduction to Integral Calculus in EC&EE Engineering applications.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions. Problems.

Self-Study: Volume by triple integration, Center of gravity.

Applications: Antenna and wave propagation, Calculation of optimum power in electrical circuits, field theory**(RBT Levels: L1, L2 and L3)**

Module-5 Linear Algebra (5L+3T)

Introduction of linear algebra related to EC&EE Engineering applications.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector.

Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications of Linear Algebra: Network Analysis, Critical point of a network system. Optimum solution.

(RBT Levels: L1, L2 and L3)

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs / Solutions of Second-order ordinary differential equations with initial/boundaryconditions
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigenvectors and find the largest and smallest eigen value by Rayleigh power method

Suggested software's: Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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

CO 1	Apply the knowledge of calculus to solve problems related to polar curves
CO 2	Learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 3	Analyze the solution of first and higher order ordinary differential equations
CO 4	Apply the knowledge of multiple integrals to compute area and volume.
CO 5	Make use of matrix theory for solving for system of linear equations and compute eigen values and eigen vectors. Familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	Chemistry for Electrical and ElectronicsEngineering stream		
Course Code:	**22CHEE12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)[1]	2:2:2:0	ExamHours	03+02
Total Hours of Pedagogy	40 hours Theory + 10to12 Lab slots	Credits	04

MODULE 1: Chemistry of Polymers and Electronic Materials (8hr)

Polymers: Introduction, types of polymerization, free radical mechanism of addition polymerization, techniques of addition polymerization, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC) and polystyrene.
Conducting polymers – synthesis and conducting mechanism of Polyacetylene
Fibers: Introduction, synthesis, properties and industrial applications of Kevlar and Polyester.
Plastics: Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon.
Self-learning: Biodegradable polymer: Introduction, synthesis, properties and applications of polylactic acid (PLA).

MODULE 2: Energy Conversion and Storage (8hr)

Batteries: Introduction, classification of batteries. Components, construction, working and applications of modern batteries; Na-ion battery, Zn-air, Ni-MH, solid state battery (Li-polymer battery) and Li-ion battery.
Fuel Cells: Introduction, construction, working and applications of methanol–oxygen and
Polymer electrolyte membrane (PEM) fuel cell.
Chemical Fuels: Introduction, calorific value, determination of calorific value using bombcalorimeter, numerical problems on GCV and NCV.
Self-learning: Electrodes for electrostatic double layer capacitors, pseudo capacitors, and
Hybrid capacitor.

MODULE 3: Corrosion Science and E-waste Management (8hr)

Corrosion Chemistry: Introduction, electrochemical theory of corrosion, types of corrosion-differential metal and differential aeration. Corrosion control - galvanization, anodization and sacrificial anode method. Factors affecting corrosion (EMF, Temperature, pH, relative area of anode and cathode and polarization).
E-waste Management: Introduction, sources, types, effects of e-waste on environment and human health, methods of disposal, advantages of recycling. Extraction of gold from E-waste.
PCB: Electroless plating – Introduction, Electroless plating of copper in the manufacture of PCB.
Self-learning: Recycling of PCB and battery components

Module-4: Water technology and Nanotechnology (8 hr)

Water technology: Introduction, sources and nature of impurities of water, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by Lime-Soda Process, determination of COD, numerical problems. Purification of water by Reverse osmosis and chlorination methods.
Nanotechnology: Introduction, properties and engineering application of carbon nanotubes, graphene and nanomaterials for water treatment(metal oxide).
Self-learning: Introduction, classification, properties and application of silicon carbide.

MODULE 5: Electrode System in Analytical Techniques (8hr)

Electrode System: Introduction, types of electrodes. Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode - Introduction, calomel electrode – construction, working and applications of calomel electrode. Concentration cell – Definition, construction and Numerical problems.
Analytical Techniques: Introduction, principle and instrumentation of Colorimetric sensors; its application in the estimation of copper, Potentiometric sensors; its application in the estimation of iron, Conductometric sensors; its application in the estimation of weak acid.
Self-learning: IR and UV- Visible spectroscopy.

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:
A1. Synthesis of polyurethane
A2. Determination of strength of an acid in Pb-acid batteryA3. Synthesis of iron oxide nanoparticles
A4. Electroplating of copper on metallic objects
B – Exercise (compulsorily any 4 to be conducted):
B1.Conductometric estimation of acid mixture
B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$
B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss methodB5.Estimation of total hardness of water by EDTA method

C – Structured Enquiry (compulsorily any 4 to be conducted):

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)
C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method C4. Estimation of Sodium present in soil/effluent sample using flame photometry
C5. Determination of Chemical Oxygen Demand(COD) of industrial waste water sample

D – Open Ended Experiments (any two):

D1. Estimation of metal in e-waste by optical sensorsD2. Electroless plating of Nickle on Copper
D3. Determination of glucose by electrochemical sensors
D4. Synthesis of polyaniline and its conductivity measurement

CO1. Identify the terms andapplications processes involved in scientific and engineering
CO2. Explain the phenomena of chemistry to describe the methods of engineering processes
CO3. Solve for the problems in chemistry that are pertinent in engineering applications
CO4. Apply the basic concepts of chemistry to explain the chemical properties andprocesses
CO5. Analyze properties and multidisciplinary situations processes associated with chemical substances in

Suggested Learning Resources:
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

5. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
6. Engineering Chemistry, Satyaprakash& Manisha Agrawal, Khanna Book Publishing, Delhi
7. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
8. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
29. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
30. Engineering Chemistry – I, D. GrourKrishana, Vikas Publishing
31. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd.,12thEdition, 2011.
32. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2nd Edition, 2016.
33. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
34. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin& A.C. Arsenault, RSCPublishing, 2005.
35. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
36. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
37. OLED Display Fundamentals and Applications, TakatoshiTsujimura, Wiley–Blackwell , 2012
38. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, ElzbietaFrackowiak, Wiley-VCH; 1st edition, 2013.
39. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESSPRESS Inc., 2017. Dr. H. Panda,
40. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: TheNational Academies Press. doi: 10.17226/4782.
41. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher,Bengaluru, ISBN 978-93-85155-70-3, 2022
42. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley& Sons, 2010
43. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, NiraliPrakashan, 2020
44. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch SeventhEdition, Cengage Learning, 2020
45. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers,4th Edition, 2021
46. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
47. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition,2002.
48. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition 2014
49. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
50. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah& PushpaIyengar., Subash Publications, 5th Edition, 2014
51. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, FourthReprint, 2015.
52. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,

Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Title:	**COMPUTER AIDED ENGINEERING DRAWING**		
Course Code	**22CED13/23**	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

Module-1

Introduction: ***for CIE only***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

Application on projections of Lines & Planes (For CIE only)

Module-2

Orthographic Projection of Solids:

Orthographic projection of right regular solids (**Solids Resting on HP only**): Prisms & Pyramids (square, pentagon, hexagon), Cylinders, Cones, Cubes .

Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).

Module-3

Isometric Projections:

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones andspheres. Isometric projection of combination of two simple solids.

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components.

Introduction to drawing views using 3D environment (For CIE only).

Module-4

Development of Lateral Surfaces of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Module-5

Multidisciplinary Applications & Practice ***(For CIE Only):***

Free hand Sketching; True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts todimensions etc

Electric Wiring and lighting diagrams; Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

Basic Building Drawing; Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges,trusses using Auto CAD or suitable software,

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts: Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or anysuitable software.

Course Outcomes

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

CO 1. Draw and communicate the objects with definite shape and dimensions

CO 2. Recognize and Draw the shape and size of objects through different views

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

Course Title:	Introduction to C Programming		
Course Code:	22ESC145/245	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	TeachingHours
Module-I **Algorithms, Flowcharts, Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output:** Arithmetic operators,relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	8 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	8 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	8 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	8 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	8 hours

Text book:

10. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

11. Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017
12. Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.
13. Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.
14. Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs – 22ESC145/245

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
      +   +
    +   +   +
      +   +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even.

ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers.

iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same.

ii) Read float elements and display the same.

iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

31. C Program to find Mechanical Energy of a particle using $E = mgh+1/2\ mv^2$.
32. C Program to convert Kilometers into Meters and Centimeters.
33. C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
34. Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
35. Implement Matrix multiplication and validate the rules of multiplication.
36. Compute sin(x)/cos(x) using Taylor series approximation. Compare you result with the built-in library function. Print both the results with appropriate inferences.
37. Sort the given set of N numbers using Bubblesort.
38. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
39. Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
40. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers

Communicative English		
Subject code	**22ENG16**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

MODULES	**TeachingHours**
Module-I **Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	3 hours
Module-II **Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants andvowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	3 hours
Module-III **Basic English Communicative Grammar and Vocabulary PART - I :**Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words,Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	3 hours
Module -IV **Basic English Communicative Grammar and Vocabulary PART - II:**Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence ofTenses (Rules in use of Tenses) and Exercises on it.	3 hours
Module-V **Communication Skills for Employment :**Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises. **Self-learning: Abrasives**: Introduction, classification, properties and application of silicon carbide (carborandum).	3 hours

Text book:

9) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
10) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference books:

21. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
22. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
23. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
24. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
25. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

Course outcome (Course Skill Set)

At the end of the course Communicative English (22ENG16) the student will be able to:

CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation.

Indian Constitution		
Subject code	**22ICO17/27**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	3 hours
Module-II Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.	3 hours
Module-III Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	3 hours
Module -IV Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	3 hours
Module-V State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3 hours

Text book:

7. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
8. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

Reference books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

Course outcome (Course Skill Set)

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

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Scientific Foundations of Health		
Subject code	**22SFH18/28**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.	3 hours
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components forhealth, Wellness and physical function, How to avoid exercise injuries.	3 hours
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.	3 hours
Module -IV **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictivepeople and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.	3 hours
Module-V **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.	3 hours

Text book:

13. **"Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU-University Website.**
14. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
15. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference books:

17. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
18. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles,McGraw Hill Education (India) Private Limited - Open University Press.
19. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
20. **Scientific Foundations of Health (Health & Welness) - General Books** published for university andcolleges references by popular authors and published by the reputed publisher.

Course outcome (Course Skill Set)

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

Course Title: **Mathematics-II for Electrical & Electronics Engineering stream**

[As per Choice Based Credit System (CBCS) scheme]

(From the academic year 2022-23)

Course Code	22MATE21	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	2-2-2	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory +10 Lab slots	Exam Hours	03

Course objectives: The goal of the course **Mathematics-II for Electrical & Electronics Engineering stream** (**22MATE21**) is to

- **Familiarize** the importance of Integral calculus and Vector calculus essential for electronics and electrical engineering.
- **Analyze** electronics and electrical engineering problems by applying Partial Differential Equations.
- **Develop** the knowledge of solving electronics and electrical engineering problems numerically.

Module-1 Vector Calculus (6L+3T)

Introduction to Vector Calculus in EC&EE Engineering applications.

Vector Differentiation: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.

Vector Integration: Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stoke's theorem. Problems.

Self-Study: Volume integral and Gauss divergence theorem.

Applications: Conservation of laws, Electrostatics, Analysis of streamlines and electric potentials.

(RBT Levels: L1, L2 and L3)

Module-2 Vector Space and Linear Transformations (6L+2T)

Importance of Vector Space and Linear Transformations in the field of EC & EE engineering applications.

Vector spaces: Definition and examples, subspace, linear span, Linearly independent and dependent sets, Basis and dimension.

Linear transformations: Definition and examples, Algebra of transformations, Matrix of a linear transformation. Change of coordinates, Rank and nullity of a linear operator, Rank-Nullity theorem. Inner product spaces and orthogonality.

Self-study: Angles and Projections. Rotation, reflection, contraction and expansion.

Applications: Image processing, AI & ML, Graphs and networks, computer graphics.

(RBT Levels: L1, L2 and L3)

Module-3 Laplace Transform (6L+3T)

Importance of Laplace Transform for EC & EE engineering applications.

Existence and Uniqueness of Laplace transform (LT), transform of elementary functions, region of convergence, Properties–Linearity, Scaling, t-shift property, s-domain shift, differentiation in the s-domain, division by t, differentiation and integration in the time domain, LT of special functions-periodic functions (square wave, saw-tooth wave, triangular wave, full & half wave rectifier), Heaviside Unit step function, Unit impulse function.

Inverse Laplace Transforms:

Definition, properties, evaluation using different methods, convolution theorem (without proof), problems, and Applications to solve ordinary differential equations.

Self-Study: Verification of convolution theorem.

Applications: Signals and systems, Control systems, LR, CR & LCR circuits.**(RBT Levels: L1, L2 and L3)**

Module-4 Numerical methods -1 (5L+3T)

Importance of numerical methods for discrete data in the field of EC & EE engineering applications.

Solution of algebraic and transcendental equations: Regula-Falsi method and Newton-Raphson method (only formulae). Problems.

Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.

N**umerical integration**: Trapezoidal, Simpson's $(1/3)_{rd}$ and $(3/8)_{th}$ rules (without proof). Problems.

S**elf-Study:** Bisection method, Lagrange's inverse Interpolation, Weddle's rule.

Applications: Estimating the approximate roots, extremum values, Area,volume and surface area.

(RBT Levels: L1, L2 and L3)

Module-5 Numerical methods -2 (5L+3T)

Introduction to various numerical techniques for handling EC & EE applications.

Numerical Solution of Ordinary Differential Equations (ODEs):

Numerical solution of ordinary differential equations of first order and first degree – Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor corrector formula (No derivations of formulae). Problems.

Self-Study: Adam-Bashforth method.

Applications: Estimating the approximate solutions of ODE for electric circuits.

(RBT Levels: L1, L2 and L3

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding gradient, divergent, curl and their geometrical interpretation and Verification of Green's theorem
2	Computation of basis and dimension for a vector space and Graphical representation of linear transformation
3	Visualization in time and frequency domain of standard functions
4	Computing inverse Laplace transform of standard functions
5	Laplace transform of convolution of two functions
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7	Interpolation/Extrapolation using Newton's forward and backward difference formula
8	Computation of area under the curve using Trapezoidal, Simpson's $(1/3)_{rd}$ and $(3/8)_{th}$ rule
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
10	Solution of ODE of first order and first degree by Runge-Kutta 4_{th} order and Milne's predictor-corrector method

.

Suggested software's: Mathematica/MatLab/Python/Scilab

Semester End Examination (SEE):

Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a

maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

Course outcome (Course Skill Set)
At the end of the course the student will be able to:

CO 1	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
CO 2	Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation
CO 3	To understand the concept of Laplace transform and to solve initial value problems.
CO 4	Apply the knowledge of numerical methods in solving physical and engineering phenomena
CO 5	Get familiarize with modern mathematical tools namely SCILAB/PYTHON/MATLAB

Suggested Learning Resources:
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)
Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw − Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	**Physics forECE & EEE Stream**		
Course Code:	**22PHYE12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours+10-12 Lab Slots	Credits	04

Module-1 (08 Hours)

Quantum Mechanics:
de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus-Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation, Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Waveforms and Probabilities. Numerical Problems

Pre-requisite: Wave–Particle dualism

Self-learning: de Broglie Hypothesis

Module-2 (08 hours)

Electrical Properties of Solids:

Conductors:
Quantum Free Electron Theory of Metals: Assumptions, Fermi-energy, Fermi factor, Variation of Fermi Factor with Temperature and Energy, Mention of expression for electrical conductivity.

Dielectric Properties: Polar and non-polar dielectrics, Electrical Polarization Mechanisms, internal fields insolids, Clausius-Mossotti equation (Derivation), Solid, Liquid and Gaseous dielectrics. Application of dielectrics in transformers, Capacitors, Electrical Insulation. Numerical Problems.

Superconductivity:
Introduction to Superconductors, Temperature dependence of resistivity, Meissner Effect, Critical Field,Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), High Temperature superconductivity, SQUID, MAGLEV, Numerical problems.

Pre-requisites: Classical Free Electron Theory

Self-learning: Dielectrics Basics

Module-3 (08 hours)

Lasers and Optical Fibers:

Lasers: Characteristics of LASER, Interaction of radiation with matter, Expression for Energy Density and its significance. Requisites of a Laser System. Conditions for Laser action. Principle, Construction and Working of Carbon Dioxide Laser. Application of Lasers in Defense (Laser range finder) and Laser Printing. Numerical Problems

Optical Fibers: Total Internal Reflection**,** Propagation mechanism, Angle of Acceptance, Numerical Aperture, Fractional Index Change, Modes of Propagation, Number of Modes and V Number, Types of Optical Fibers. Attenuation and Mention of Expression for Attenuation coefficient, Attenuation Spectrum of an Optical Fiber with Optical Windows. Discussion of Block Diagram of Point to Point Communication, Intensity based Fiber Optic Displacement Sensor, Merits and Demerits, Numerical problems.

Pre-requisite: Properties of light

Self-learning: Total Internal Reflection

Module-4 (08 hours)

Maxwell's Equations and EM waves:

Maxwell's Equations: Fundamentals of Vector Calculus. Divergence and Curl of Electric field and Magnetic field (static), Gauss' divergence theorem and Stoke's theorem. Description of laws of Electrostatics, Magnetism, Faraday's laws of EMI, Current Density, Equation of Continuity, Displacement Current (with derivation), Maxwell's equations in vacuum, Numerical Problems

EM Waves: The wave equation in differential form in free space (Derivation of the equation using Maxwell's equations), Plane Electromagnetic Waves in vacuum, their transverse nature.

Pre-requisite: Electricity & Magnetism

Self-learning: Fundamentals of vector calculus.

Module-5 (08 hours)

Semiconductors and Devices:
Fermi level in Intrinsic & Extrinsic Semiconductor, Expression for concentration of electrons in conduction band & holes concentration in valance band (only mention the expression), Relation between Fermi energy & Energy gap in intrinsic semiconductors(derivation), Law of mass action, Electrical conductivity of a semiconductor (derivation),

Hall effect, Expression for Hall coefficient (derivation) and its application. Photo-diode and Power responsivity, Construction and working of Semiconducting Laser, Four probe method to determine resistivity, Phototransistor, Numerical problems.

Pre-requisite: Basics of Semiconductors

Self-learning: Fermi level in Intrinsic & Extrinsic Semiconductor

CO1 Describe the fundamental principles of the Quantum Mechanics and the essentials of Photonics.

CO2Elucidate the concepts of conductors, dielectrics and superconductivity

CO3 Discuss the fundamentals of vector calculus and their applications in Maxwell's Equations and EM Waves.

CO4 Summarize the properties of semiconductors and the working principles of semiconductor devices.

CO5 Practice working in groups to conduct experiments in physics and **Perform** precise and honest measurements.

Laboratory Component:

Any Ten Experiments have to be completed from the list of experiments

Note: The experiments have to be classified into

e) Exercise
f) Demonstration
g) Structured Inquiry
h) Open Ended

Based on the convenience classify the following experiments into above categories selecting at least three experimentsfor each type. Select at least one simulation/spreadsheet activity.

List of Experiments

1. Determination of wavelength of LASER using Diffraction Grating.
2. Determination of acceptance angle and numerical aperture of the given Optical Fiber.
3. Determination of Magnetic Flux Density at any point along the axis of a circular coil.
4. Determination of resistivity of a semiconductor by Four Probe Method
5. Study the I-V Characteristics of the Given Bipolar Junction Transistor.
6. Determination of dielectric constant of the material of capacitor by Charging and Discharging method.
7. Study the Characteristics of a Photo-Diode and to determine the power responsivity / Verification ofInverse Square Law of Intensity of Light.
8. Study the frequency response of Series & Parallel LCR circuits.
9. Determination of Plank's Constant using LEDs.
10. Determination of Fermi Energy of Copper.
11. Identification of circuit elements in a Black Box and determination of values of the components.
12. Determination of Energy gap of the given Semiconductor.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Study of Application of Statistics using spread sheets
16. PHET Interactive
17. Determination of frequency of alternating current using Sonometer
18. Interference at an Air wedge

Simulations(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)

Course Title: **ELEMENTS OF ELECTRICAL ENGINEERING**		
Course Code	**22EEE13/23**	**CIE: 50**
Number of Lecture Hours/Week	**2 hours (Theory) + 2hours (practical)**	**SEE: 50**
Total Number of Lecture Hours	**40**	**SEE Hours: 03**

Modules	**Teaching Hours**
Module - I **AC Circuits:** **Single Phase Circuits:** AC terminologies, Analysis of R, L, C, R-L Series circuits, Disadvantages of low power factor. **Three Phase Circuits:** Advantages, types of connections, Relation between phase & line values. **Practical Component:** Measurement of power by VAW method.,3-phase power measurement by two-wattmeter method for balanced load.	**8hrs**
Module - II **Electromagnetism and Single Phase Transformer:** **Electromagnetism:** Faraday Laws of Electromagnetic Induction, Fleming's rules, Lenz's law, types of EMF and numerical. **Transformer:** Principle, construction and working of single phase transformer, types (based on construction), EMF equation, losses, (Numerical related to EMF equation and Efficiency) **Practical Component**: efficiency and Voltage regulation.	**8hrs**
Module - III **DC Machines:** **DC generator:** Principle, Construction, working, types and EMF equation. (Numerical on EMF equation) **DC Motor:** Principle, Working, back emf and its significance, torque equation, necessity of starter, 3-point starter. (Numerical on Torque & Voltage Equations) **Practical Component:** DC Shunt Motor and Starter	**8hrs**
Module - IV **Three Phase AC Machines:** **Alternator:** Principle of operation, types and constructional features, EMF equation of alternator.(Excluding the winding factors derivation) Numerical on EMF equation. **Three phase Induction Motor:** Construction, concept of rotating magnetic field, principle of operation, Star – Delta starter.(Numerical on Slip calculations only). **Practical Component:** Auto Transformer, Starter for 3 Phase IM and Effect of phase sequencing.	**8hrs**
Module – V **Generation, Tariff, Measuring Instruments and Electric Safety:** **Generation of Power:** Block schematic representation of hydroelectric, thermal, nuclear and solar power generating stations (Self study component). **Tariff:** Objectives of Tariff, Desirable characteristics of Tariff, Three-part tariff. **Measuring Instruments:** Principle, Construction & working of Dynamometer type wattmeter &Single phase energy meter.	**8hrs**

Electric Safety: Necessity of earthing, plate & pipe earthing, Elementary discussion on Fuse & MCB. Electric Shock, Effects, Remedies & Precautions (Self study component).	

CO1 State, illustrate electric circuit and solving the networks

CO2 State, illustrate magnetic circuit, solving the networks and identify the parts, explain the construction, working and examine the performance of Transformer

CO3 Identify the parts, explain the construction, working and examine the performance of DC Machines.

CO4 Recognize the parts, give the illustration of construction and compute the performance of AC machines.

CO5 Outline the Power Generating stations, analyze the tariff, synthesize the safety measures and explain the working of measuring instruments.

.

. **Reference books:**

1. J P Tiwari," Basic Electrical Engineering", New age Publications, 2nd edition, 2011.
2. Rajendra Prasad “Fundamentals of Electrical Engineering", PHI 3rd edition, 2014.
3. B L Theraja& A K Theraja" Electrical Technology", Vol 1 , 2nd edition.
4. B L Theraja& A K Theraja" ABC of Electrical Engineering", 2nd edition.
5. D.P. Kothari and Nagrath “Theory and Problems in electrical Engineering”, PHI edition 2011.
6. V. N. Mittal and Arvind Mittal;, “ Basic Electrical Engineering” McGraw Hill.

R.V. Srinivasa Murthy "Basic Electrical Engineering" Sanguine Technical Publisher2004.

INTRODUCTION TO ELECTRONICS ENGINEERING			
Subject Code	22ECSC143/243	22BEE13/23	CIE: 50
Number of Lecture Hours/Week	3 (Theory)		SEE: 50
Total Number of LectureHours	40		SEE Hours: 03

Module#	Teaching Hours
Module-1	**08 Hours**

Power Supplies: Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators,Output resistance and voltage regulation, Voltage multipliers.
Amplifiers: CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes.

Module-2	08 Hours

Operational amplifiers: Ideal op-amp; characteristics of ideal and practical op-amp.
Practical op-amp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, subtractor,integrator, differentiator.
Oscillators: Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator (using op-amp), Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)

Module-3	08 Hours

Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates
Combinational logic: Introduction, Design procedure, Adders- Half adder, Full adder.

Module-4	08 Hours

Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC
Sensors and Interfacing: Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display.

Module-5	08 Hours

Analog Communication Schemes: Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky)
Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.

Text books:

3. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015. DOI https://doi.org/10.4324/9781315737980. eBook ISBN9781315737980 2nd
4. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-2030417-84.

D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India),PrivateLimited, 2018

CO1 Design basic power supply & study concept of amplifiers.

CO2 To analyze working of op-amp with its applications & to studyoscillators.

CO3 Develop competence knowledge to construct basic digital circuit by make use of basic gate and its function.

CO4 Understand the concept of embedded system. Study role of Sensor and its interfacing.

CO5 To study various analog and digital modulation and demodulationtechniques

Professional Writing Skills in English		
Subject code	**22PWS16/26**	Credit: 0
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 .5hours

MODULES	TeachingHours
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	3 hours
Module-II **Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction andConclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	3 hours
Module-III **Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error& Sentence Improvement, Cloze Test and Theme Detection Exercises.	3 hours
Module -IV **Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	3 hours
Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and itsimportance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	3 hours

Text book:

9) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
10) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].

Reference books:

21) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
22) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
23) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
24) **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
25) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

Course outcome (Course Skill Set)

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills.
CO5	To learn about Techniques of Information Transfer through presentation in different level.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KSK17 / 27	**SAMSKRUTHIKA KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 - 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:
The course (22KSK17/27) will enable the students,

1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸಿವುದು.
3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)
1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ 2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ 3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ
ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)
1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ. 2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು 3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ
ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)
1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು 2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ 3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು
ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)
1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್ 2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ
ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)
1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ 2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :
At the end of the course the student will be able to:

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

Pattern of question paper

3. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KBK17 / 27	**BALAKE KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 – 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22K**B**K17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Module - 1 **(03 hours of pedagogy)**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2	(03 hours of pedagogy)
1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - **Possessive forms of nouns, dubitive question and Relative nouns** 2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು **Qualitative, Quantitative and Colour Adjectives, Numerals** 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –**Predictive Forms, Locative Case**	
Module - 3	**(03 hours of pedagogy)**
1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - **Dative Cases, and Numerals** 2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು **-Ordinal numerals and Plural markers** 3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –**Defective/Negative Verbs & Colour Adjectives**	
Module- 4	**(03 hours of pedagogy)**
1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು **Permission, Commands, encouraging and Urging words (Imperative words and sentences)** 2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು **Accusative Cases and Potential Forms used in General Communication** 3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs 4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words	
Module - 5	**(03 hours of pedagogy)**
1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs 2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms 3. **Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation**	

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Pattern of question paper

5. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

INNOVATION and DESIGN THINKING			
Subject code	21IDT18/28	Credit: 01	
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks	
Total hours: 25	CIE: 50 Marks	SEE: 2 hours	

MODULES		Hours
Module-I **PROCESS OF DESIGN** **Understanding Design thinking** Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping		5
Teaching-Learning Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
Module-II **Tools for Design Thinking** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design		5
Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-III **Design Thinking in IT** Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenario based Prototyping		5
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module -IV **DT For strategic innovations** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.		5
Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-V Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		5
Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

Text book: John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.

17. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.
18. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
19. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.

Reference books:

9. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
10. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

Course outcome (Course Skill Set) At the end of the course the student will be able to:

CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through differenttechnique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

P.D.A College of Engineering Kalburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education(OBE)and Choice Based Credit System(CBCS) (Effective from the academic year 2022-23)

I Semester (IPE Stream) **(Physics Group)**

Sl. No	Course and CourseCode		CourseTitle	TD/PSB	Teaching Hours/Week				Examination				Credits
					The	Tutori	Practi cal/	SDA	Duration in hours	CIEMark	SEEMarks	Total arks	
					L	T	P	S					
1	ASC(IC)	22MATM21	Mathematics for ME stream-I	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYM22	Physics for ME Stream	PHY	2	2	2	0	03	50	50	100	04
3	ESC	22EME23	Elements of mechanical engineering	Civil Engineering Dept	2	2	0	0	03	50	50	100	03
4	ESC-I	22ESC145	Introduction to C Programming	Respective Engg dept	3	0	0	0	03	50	50	100	03
5.	PLC-I	22ETC15X	**Emerging Technology Courses**		2	0	2	0	03				
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	1.5	50	50	100	01
8	AEC/SDC	22IDT28	Innovation and Design Thinking	Any Dept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

P.D.A College of Engineering Kalaburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE)and Choice Based Credit System (CBCS) (Effective from the academic year 2022-23)

I I Semester (IPE Stream) Mech, IPE /EE **(Chemistry Group)**

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				
					T	Tuto	Prac	SDA	Duration in hours	CIE M	SEE Mar	Total Mark	
					L	T	P	S					
1	ASC(IC)	22MATM11	Mathematics for ME Stream-II	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHEM12	Chemistry for Civil Engg Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED13	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC242	Introduction to Electrical Engineering	Respective EnggDept	3	0	0	0	03	50	50	100	03
5	ETC-I	22PLC25X	Programming Language Courses-I&II		3	0	0	0	03				
6	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMS	22ICO17/27	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	22SFH18	Scientific Foundations of Health	AnyDept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

Course Title: **Mathematics-I for Mechanical Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	**22MATM11**	**CIE Marks**	**50**
Credits	**04**	**SEE Marks**	**50**
Course Type	**Integrated**		
Contact Hours/Week (L-T-P)	**2-2-2**	**Total Marks**	**100**
Contact Hours of Pedagogy	**42 hours Theory +10 Lab slots**	**Exam Hours**	**03**

Module-1 Calculus (5L+3T)

Introduction to polar coordinates and curvature relating to Mechanical engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, and angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems.

Self-study: Center and circle of curvature, evolutes and involutes.

Applications: Applied Mechanics, Structural design and paths, Strength of materials, Elasticity.

(RBT Levels: L1, L2 and L3)

Module-2 Series Expansion and Multivariable Calculus (6L+3T)

Introduction to series expansion and partial differentiation in the field of Mechanical engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms : L-Hospital's rule, problems.

Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables – Simple Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

Applications: Computation of stress and strain, Errors and approximations, Estimating the critical points and extreme values**(RBT Levels: L1, L2 and L3)**

Module-3 Ordinary Differential Equations (ODEs) of first order (6L+2T)

Introduction to first-order ordinary differential equations pertaining to the applications for Mechanical engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on $\frac{1}{\mathrm{N}}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{\mathrm{M}}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$

Orthogonal trajectories and Newton's law of cooling.

Nonlinear differential equations: Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations - Problems**.**

Self-Study: Applications of ODEs in Mechanical Engineering problems like vibration problems, solution of non-linear ODE by the method of solvable for x and y.

Applications: Rate of Growth or Decay, Conduction of heat.**(RBT Levels: L1, L2 and L3)**

Module-4 Integral Calculus (6L+3T)

Introduction to Integral Calculus in Mechanical Engineering applications.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions. Problems.

Self-Study: Volume by triple integration, Center of gravity.

Applications: Applications to mathematical quantities (Area, Surface area, Volume), Analysis of probabilistic models.**(RBT Levels: L1, L2 and L3)**

Module-5 Linear Algebra (5L+3T)

Introduction of linear algebra related to Mechanical Engineering applications.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector.

Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications: Structural Analysis, Balancing equations.**(RBT Levels: L1, L2 and L3)**

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigenvectors and find the largest and smallest eigen value by Rayleigh power method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)
At the end of the course the student will be able to:

CO 1	Apply the knowledge of calculus to solve problems related to polar curves
CO 2	Learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 3	Analyze the solution of linear and nonlinear ordinary differential equations
CO 4	Apply the knowledge of multiple integrals to compute area and volume.
CO 5	Make use of matrix theory for solving for system of linear equations and compute eigen values and eigen vectors. Familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB

Suggested Learning Resources:
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)
Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	**Physics for ME Stream**		
Course Code:	**22PHYM12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab slots	Credits	04

Module-1 (8 Hours)

Module -I: Oscillations and Shock waves:

Oscillations: Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Sprigs: Stiffness Factor and its Physical Significance, Series and Parallel combination of springs (Derivation), Types of Springs and their applications. Theory of Damped oscillations (Qualitative), Types of Damping (Graphical Approach). Engineering applications of Damped oscillations, Theory of Forced oscillations (Qualitative), Resonance, Sharpness of resonance. Numerical Problems.

Shock waves: Mach number and Mach Angle, Mach Regimes, Definition and Characteristics of Shock waves, Construction and working of Reddy Shock tube, Applications of Shock Waves, Numerical problems.

Pre-requisites: Basics of Oscillations

Self-learning: Simple Harmonic motion, Differential equation for SHM

Module-2 (8 Hours)

Elasticity

Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio. Beams, Bending moment and derivation of expression, Cantilever and I section girder and their Engineering Applications, Elastic materials (qualitative). Failures of engineering materials - Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), Numerical problems.

Pre requisites: Elasticity, Stress & StrainSelf-learning: Stress-Strain Curve

Module-3 (8 Hours)

Thermoelectric materials and devices:

Thermo emf and thermo current, Seeback effect, Peltier effect, Seeback and Peltier coefficients, figure of merit (Mention Expression), laws of thermoelectricity. Expression for thermo emf in terms of T1 and T2, Thermo couples, thermopile, Construction and Working of Thermoelectric generators (TEG) and Thermoelectric coolers (TEC), low, mid and high temperature thermoelectric materials, Applications: Exhaust of Automobiles, Refrigerator, Space Program (RTG), Numerical Problems

Pre requisites: Basics of Electrical conductivitySelf-learning: Thermo emf and thermo current

Module-4 (8 Hours)

Photonics:

LASER

Properties of a LASER Beam, Interaction of Radiation with Matter, LASER action, Population Inversion, Metastable State, Requisites of a LASER System, ND YAG LASER, LASER Range Finder, LIDAR, Cutting, Drilling, Welding and Surface hardening.

Optical Fiber

Principle and Construction of Optical Fibers, Acceptance angle and Numerical Aperture (NA), Expression for NA, Modes of Propagation, Attenuation and Fiber Losses, Fiber Optic Displacement Sensor, Fiber Optic Temperature Sensor, Numerical Problems

Pre requisite: Properties of light.

Self-learning: Total Internal Reflection.

Module-5 (8 Hours)

Material Characterization and Instrumentation Techniques:

Introduction to nano materials: Nanomaterial and nanocomposites. Principle, construction and working of X-ray Diffractometer, Crystallite size determination by Scherrer equation, Atomic Force Microscopy (AFM): Principle, construction, working and applications, X-ray photoelectron spectroscopy(XPS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Numerical Problems.

Pre requisites: Quantum MechanicsSelf-learning: Crystallites

Course outcome (Course Skill Set)

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

CO1 **Elucidate** the concepts in oscillations, waves, elasticity and material failures

CO2 **Summarize** the fundamentals of Thermoelectric materials and their application

CO3 **Discuss** The principles photonic devices and their application relevant to mechanical engineering

CO4 **Explain** the various material characterization techniques

CO5 **Practice** working in groups to conduct experiments in physics and **perform** precise and honest measurements.

Laboratory Component:

Any Ten Experiments have to be completed from the list of experimentsNote: The experiments have to be classified into

a) Exercise

b) Demonstration

c) Structured Inquiry

d) Open Ended

Based on the convenience classify the following experiments into above categories.

Select at least onesimulation /spreadsheet activity.

List of Experiments

1. Determination of Young's modulus of the material of the given bar Uniform Bending.
2. Determination of Rigidity modulus of the Material of the wire using Torsional Pendulum.
3. Study of Forced Mechanical Oscillations and Resonance.
4. Study of the frequency response of Series & Parallel LCR circuits.
5. Determination of Fermi Energy of the given Conductor.
6. Determination of Resistivity by Four Probe Method.

7. Determination of effective spring constant of the given springs in series and parallel combinations.
8. Determination of Young's modulus of the material of the given bar Single Cantilever.
9. Determination of the Moment of Inertia of the given irregular body using torsional pendulum.
10. Determination of Wavelength of Laser using Diffraction Grating.
11. Determination of Acceptance angle and Numerical Aperture of the given Optical Fiber.
12. Determination of the Radius of Curvature of the given Plano Convex Lens by setting Newton's Rings.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Application of Statistics using Spread Sheets.
16. PHET Interactive Simulations
17. Flywheel
18. Interference of Air wedge

:*(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)*

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Vibrations and Waves (MIT introductory Physics Series), A P French, CBS, 2003 Edition
2. Timoshenko, S. and Goodier J.N. "Theory of Elasticity", 2nd Edition, McGraw Hill Book Co, 2001.
3. Sadhu Singh, "Theory of Elasticity", Khanna Publishers, 1997
4. Mechanical Properties of Engineered Materials by Wole Soboyejo, CRC Press; 1st edition, 2002
5. Heat & Thermodynamics and Statistical Physics(XVIII-Edition) – Singhal, Agarwal & Satyaprakash – PragatiPrakashan, Meerut, 2006. 4
6. Heat and Thermodynamics (I-Edition) – D.S. Mathur - S. Chand & Company Ltd., New-Delhi, 1991
7. Heat and Thermodynamics, Brijlal & Subramanyam, S. Chand & Company Ltd., New-Delhi.
8. Physics of Cryogenics by Bahman Zohuri, Elsevier, 2018
9. Materials Characterization Techniques-Sam Zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008.
10. Characterization of Materials- Mitra P.K . Prentice Hall India Learning Private Limited.
11. Nanoscience and Nanotechnology: Fundamentals to Frontiers – M.S. Ramachandra Rao & Shubra Singh, WileyIndia Pvt Ltd.
12. Nano Composite Materials-Synthesis, Properties and Applications, J. Parameswaranpillai, N. Hameed, T.Kurian, Y. Yu, CRC Press.

Shock waves made simple by Chintoo S Kumar, K Takayama and K P J Reddy: Willey India Pvt. Ltd,Delhi,2014

Course Title:	ELEMENTS OF MECHANICAL ENGINEERING		
Course Code:	22EME13/23	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Module-1 (8 hours)

Introduction to Mechanical Engineering (Overview only):
Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies indifferent sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Steam Formation and Application:
Modes of heat transfer, Steam formation, Types of steam, Steam properties and applications of steam (simple numerical problems).

Energy Sources and Power Plants:
Basic working principles of Hydel power plant, Thermal power plant, nuclear power plant, Solar power plant, Tidal power plant and Wind power plant.

Module-2 (8 hours)

Machine Tool Operations:
Lathe: Principle of working of a center lathe, lathe operations: Turning, facing, knurling, threadcutting, taper turning by swivelling the compound rest,
Drilling Machine: Working of simple drilling machine, drilling operations: drilling, boring, reaming,tapping, counter sinking, counter boring,
Milling Machine: Working and types of milling machine, milling operations: plane milling, endmilling and slot milling. (No sketches of machine tools, sketches to be used only for explaining the operations).
Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantagesand applications of CNC, 3D printing.

Module-3 (8 hours)

Introduction to IC Engines: Components and working principles, 4-Stroke Petrol and Diesel engines, Application of IC Engines, performance of IC engines (Simple numerical).
Introduction to Refrigeration and Air Conditioning: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner & Applications of air Conditioners

Module-4 (8 hours)

Mechanical Power Transmission:
Gear Drives: Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)
Belt Drives: Introduction, Types of belt drives (Flat and V-Belt Drive), length of the belt and tensions ratio (simple numerical problems)**Joining Processes**: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding, MIG welding and Fusionwelding.

Module-5 (8 hours)

Insight into future mobility technology; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.
Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing and assembly andinspection.

CO1 Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources

CO2 Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.

CO3 Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics

CO4 Determine the condition of steam and its energy, performance parameters of IC engines, velocity ratio and power transmitted through power transmission systems.

CO5 Explain the Working Principle of EV vehicles and concepts of Mechatronics and Robotics

Suggested Learning Resources:
Test Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

15. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008
16. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, Media Promotersand Publishers Pvt. Ltd., 2010.

Reference Books

1. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012
2 Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rdEd., 2003.
1. 3. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1

Course Title:	Introduction to C Programming		
Course Code:	**22ESC145/245**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	TeachingHours
Module-I **Algorithms, Flowcharts, Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output:** Arithmetic operators,relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	8 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	8 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	8 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	8 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	8 hours

Text book:

17. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

18.Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017

19.Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.

20.Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.

21.Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs – 22ESC145/245

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
      +   +
    +   +   +
      +   +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even.

ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers.

iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same.

ii) Read float elements and display the same.

iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

41. C Program to find Mechanical Energy of a particle using $E = mgh+1/2\ mv^2$.
42. C Program to convert Kilometers into Meters and Centimeters.
43. C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
44. Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
45. Implement Matrix multiplication and validate the rules of multiplication.
46. Compute sin(x)/cos(x) using Taylor series approximation. Compare you result with the built-in library function. Print both the results with appropriate inferences.
47. Sort the given set of N numbers using Bubblesort.
48. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
49. Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
50. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers

Communicative English		
Subject code	**22ENG16**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

MODULES	TeachingHours
Module-I **Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	3 hours
Module-II **Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants andvowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	3 hours
Module-III **Basic English Communicative Grammar and Vocabulary PART - I :**Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words,Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	3 hours
Module -IV **Basic English Communicative Grammar and Vocabulary PART - II:**Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence ofTenses (Rules in use of Tenses) and Exercises on it.	3 hours
Module-V **Communication Skills for Employment :**Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises. **Self-learning: Abrasives**: Introduction, classification, properties and application of silicon carbide (carborandum).	3 hours

Text book:

11) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
12) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference books:

26. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
27. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
28. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
29. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
30. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

Course outcome (Course Skill Set)

At the end of the course Communicative English (22ENG16) the student will be able to:

CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KSK17 / 27	**SAMSKRUTHIKA KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 - 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes**

Total : 15 Hours

Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22KSK17/27) will enable the students,

1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸಿವುದು.
3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)
1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ 2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ 3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ. ವಿ. ಕೇಶವಮೂರ್ತಿ
ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)
1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ. 2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು 3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ
ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)
1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು 2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ 3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು
ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)
1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್ 2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ
ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)
1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ 2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

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

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

Pattern of question paper

4. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KBK17 / 27	**BALAKE KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 – 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22K**B**K17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Module - 1 **(03 hours of pedagogy)**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2	(03 hours of pedagogy)
1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - **Possessive forms of nouns, dubitive question and Relative nouns** 2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು **Qualitative, Quantitative and Colour Adjectives, Numerals** 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –**Predictive Forms, Locative Case**	
Module - 3	**(03 hours of pedagogy)**
1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - **Dative Cases, and Numerals** 2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು **-Ordinal numerals and Plural markers** 3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –**Defective/Negative Verbs & Colour Adjectives**	
Module- 4	**(03 hours of pedagogy)**
1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು **Permission, Commands, encouraging and Urging words (Imperative words and sentences)** 2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು **Accusative Cases and Potential Forms used in General Communication** 3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs 4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words	
Module - 5	**(03 hours of pedagogy)**
1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs 2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms 3. **Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation**	

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Pattern of question paper

6. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

INNOVATION and DESIGN THINKING			
Subject code	21IDT18/28	Credit: 01	
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks	
Total hours: 25	CIE: 50 Marks	SEE: 2 hours	

MODULES		Hours
Module-I **PROCESS OF DESIGN** **Understanding Design thinking** Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping		
Teaching-Learning Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
Module-II **Tools for Design Thinking** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design		
Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-III **Design Thinking in IT** Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenario based Prototyping		
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module -IV **DT For strategic innovations** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Modeldesign.		
Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-V Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		
Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

Text book:

20. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.
21. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.
22. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
23. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.

Reference books:

11. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
12. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

Course outcome (Course Skill Set)

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

CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through differenttechnique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

Course Title: **Mathematics-II for Mechanical Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	**22MATM21**	**CIE Marks**	**50**
Credits	**04**	**SEE Marks**	**50**
Course Type	**Integrated**		
Contact Hours/Week (L-T-P)	**2-2-2**	**Total Marks**	**100**
Contact Hours of Pedagogy	**42 hours Theory +10 Lab slots**	**Exam Hours**	**03**

Module-1 Vector Calculus (6L+3T)

Introduction to Vector Calculus in Mechanical Engineering applications.
Vector Differentiation: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.
Vector Integration: Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stoke's theorem. Problems.
Self-Study: Volume integral and Gauss divergence theorem.
Applications: Heat and mass transfer, oil refinery problems, environmental engineering. Analysis of streamlines, velocity and acceleration of a moving particle.**(RBT Levels: L1, L2 and L3)**

Module-2 Ordinary Differential Equations of higher order (6L+2T)

Importance of higher-order ordinary differential equations in Mechanical Engineering applications.
Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations- Problems.
Self-Study: Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients.
Applications: Oscillations of a spring, Transmission lines, Highway engineering.**(RBT Levels: L1, L2 and L3)**

Module-3 Partial Differential Equations (PDEs) (5L+3T)

Importance of partial differential equations for Civil Engineering applications
Formation of PDE's by elimination of arbitrary constants and functions. Solution of nonhomogeneous PDE by direct integration. Homogeneous PDEs involving derivatives with respect to one independent variable only. Solution of Lagrange's linear PDE. Derivation of one-dimensional heat equation and wave equation.
Self-Study: Solution of one-dimensional heat equation and wave equation by the method of separation of variables.
Applications: Design of structures (vibration of rod/membrane**(RBT Levels: L1, L2 and L3)**

Module-4 Numerical Methods -1 (6L+3T)

Importance of numerical methods for discrete data in the field of Mechanical Engineering.
Solution of algebraic and transcendental equations: Regula-Falsi and Newton-Raphson methods (only formulae). Problems. Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's interpolation formulae (All formulae without proof). Problems
N**umerical integration**:Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof),Examples
Self-Study: Bisection method, Lagrange's inverse Interpolation**.**
Applications: Estimating the approximate roots, extremum values, Area, volume, and surface area. Finding approximate solutions to Mechanical engineering problems. **(RBT Levels: L1, L2 and L3)**

Module-5 Numerical Methods -2 (5L+3T)

Introduction to various numerical techniques for handling Mechanical Engineering applications.
Numerical Solution of Ordinary Differential Equations (ODE's): Numerical solution of ordinary differential equations of first order and first degree – Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor-corrector formula (No derivations of formulae). Problems.
Self-Study: Adam-Bashforth method.
Applications: Finding approximate solutions to ODE related to Mechanical engineering fields
(RBT Levels: L1, L2 and L3

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding gradient, divergent, curl and their geometrical interpretation
2	Verification of Green's theorem
3	Solutions of Second-order ordinary differential equations with initial/boundary conditions
4	Solution of a differential equation of oscillations of a spring/deflection of a beam with different loads
5	Solution of one-dimensional heat equation and wave equation
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7	Interpolation/Extrapolation using Newton's forward and backward difference formula
8	Computation of area under the curve using Trapezoidal, Simpson's $(1/3)^{rd}$ and $(3/8)^{th}$ rule
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
10	Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)
At the end of the course the student will be able to:

CO 1	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
CO 2	Analyze the solution of higher order ordinary differential equations..
CO 3	Demonstrate partial differential equations and their solutions for physical interpretations.
CO 4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
CO 5	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)
Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	Chemistry for MechanicalEngineering stream		
Course Code:	22CHEM12/22	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)[1]	2:2:2:0	ExamHours	03+02
Total Hours of Pedagogy	40 hours Theory +10 to12 Lab slots	Credits	04

Module-1: Energy; Source, Conversion and Storage (8 hr)

Fuels: Introduction, calorific value, determination of calorific value using bombcalorimeter, numerical problems on GCV and NCV.
Green fuels: Introduction, power alcohol, synthesis and applications of biodiesel.
High energy fuels: Production of hydrogen by electrolysis of water and its advantages. **Energy devices:** Introduction, construction, working, and applications of Li-ion, Na-ion,Li-MnO2 battery and methanol-oxygen fuel cell.
Self-learning: Plastic recycling to fuels and its monomers or other useful products.

Module-2: Corrosion Science and Engineering (8 hr)

Corrosion: Introduction, mechanism of electrochemical corrosion with iron as an example, types (differential metal and aeration), Stress corrosion. Factors affecting corrosion (EMF, Temperature, pH, relative area of anode and cathode and polarization).
Corrosion control: Metal coating-galvanization, surface conversion coating-anodization and cathodic protection-sacrificial anode method. Corrosion testing by weight loss method.
Metal finishing: Introduction, technological importance. Electroplating: Introduction, Electroplating of chromium. Electroless plating: Introduction,electroless plating of nickel.
Self-learning: Electroless plating of copper in the manufacture of PCB.

Module-3: Macromolecules for Engineering Applications (8 hr)

Polymers: Introduction, methods of polymerization (Condensation and Freeradical), Techniques of addition polymerization, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC) and polystyrene.
Conducting polymers – synthesis and conducting mechanism of Polyacetylene.
Fibers: Introduction, synthesis, properties and industrial applications of Kevlar and Polyester.
Plastics: Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon.
Polymer composites: Introduction, properties and applications of fiber reinforcedpolymers composites (FRPC).
Self-learning: Biodegradable polymer: Introduction, synthesis, properties and applications of polylactic acid (PLA), introduction, classification, properties and application of lubricants.

Module-4: Phase Rule and Analytical Techniques (8 hr)

Phase rule: Introduction, Definition of terms: phase, components, degree of freedom, phase rule equation. Phase diagram: Two component-lead-silver system.
Analytical techniques: Introduction, principle, instrumentation of potentiometric sensors; its application in the estimation of iron, Coductometric Titration of strong acid versus strong base, Optical sensors (colorimetry); its application in the estimation of the copper, pH-sensor (Glass electrode); its application in the determinationof pH of beverages.
Self-learning: Determination of viscosity of biofuel and its correlation with temperature.

Module-5: Water technology and Nanotechnology (8 hr)

Water technology: Introduction, sources and nature of impurities of water, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by Lime-Soda Process, determination of COD, numerical problems. Purification of water by Reverse osmosis and chlorination methods.
Nanotechnology: Introduction,properties and engg.application of carbon nanotubes,grapheme and nanomaterials for water treatment(metal oxide)
Self-learning: Introduction,classification, properties and application of silicon carbide.

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:

A1. Synthesis of polyurethane
A2. Preparation of urea formaldehyde resinA3.
Synthesis of iron oxide nanoparticles A4. Determination
of acid value of biofuel

B – Exercise (compulsorily any 4 to be conducted):

B1. Conductometric estimation of acid mixture
B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$
B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss methodB5. Estimation of total hardness of water by EDTA method

C – Structured Enquiry (compulsorily any 4 to be conducted):

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)
C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method C4. Estimation of Sodium present in soil/effluent sample using flame photometry
C5. Determination of Chemical Oxygen Demand (COD) of industrial waste water sample

D – Open Ended Experiments (any two):

D1. Estimation of percentage of iron in steel
D2. Electroplating of desired metal on substrateD3. Synthesis of biodiesel
D4. Synthesis of Aluminium Oxide nano particle

CO1. Identify theterms andapplications processes involved in scientific and engineering
CO2. Explain the phenomena of chemistry to describe the methods of engineering processes
CO3. Solve the problems in chemistry that are pertinent in engineering applications
CO4. Apply the basic concepts of chemistry to explain the chemical properties andprocesses
CO5. Analyze properties and multidisciplinary situations processes associated with chemical substances in

Suggested Learning Resources:
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. Grour Krishana, Vikas Publishing
7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.
8. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. InternationalPublishing house. 2nd Edition, 2016.
9. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSCPublishing, 2005.
11. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
12. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
13. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley–Blackwell , 2012
14. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, Elzbieta Frackowiak, Wiley-VCH; 1st edition, 2013.
15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESSPRESS Inc., 2017. Dr. H. Panda,
16. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: TheNational Academies Press. doi: 10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher,Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley& Sons, 2010
19. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, NiraliPrakashan, 2020

20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch SeventhEdition, Cengage Learning, 2020
21. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers,4th Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition, 2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition 2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & PushpaIyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, FourthReprint, 2015.
28. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,

Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Title:	**COMPUTER AIDED ENGINEERING DRAWING**		
Course Code	**22CED13/23**	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

Module-1

Introduction: ***for CIE only***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

Application on projections of Lines & Planes (For CIE only)

Module-2

Orthographic Projection of Solids:

Orthographic projection of right regular solids (**Solids Resting on HP only**): Prisms & Pyramids (square, pentagon, hexagon), Cylinders, Cones, Cubes .

Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).

Module-3

Isometric Projections:

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones andspheres. Isometric projection of combination of two simple solids.

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components.

Introduction to drawing views using 3D environment (For CIE only).

Module-4

Development of Lateral Surfaces of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Module-5

Multidisciplinary Applications & Practice ***(For CIE Only):***

Free hand Sketching; True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts todimensions etc

Electric Wiring and lighting diagrams; Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

Basic Building Drawing; Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges,trusses using Auto CAD or suitable software,

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts: Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or anysuitable software.

Course Outcomes

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

CO 1. Draw and communicate the objects with definite shape and dimensions

CO 2. Recognize and Draw the shape and size of objects through different views

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

Course Title: **INTRODUCTION TO ELECTRICAL ENGINEERING**		
Course Code	**22ESC142/242**	**CIE: 50**
Number of Lecture Hours/Week	**3hours (Theory)**	**SEE: 50**
Total Number of Lecture Hours	**40**	**SEE Hours: 03**

Modules	**Hours**
Module - I **Introduction:** Conventional and non-conventional energy resources; **Power Generation:** Hydel, Nuclear, Solar & wind power generation (Block Diagram approach). **Electromagnetism:** Faraday Laws of Electromagnetic Induction, Fleming's rules, Lenz's law, types of EMF and numerical.	**8hrs**
Module - II **A.C. Fundamentals:** Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical). **Three Phase Circuits:** Advantages, three phase connections (Star & Delta) (Excluding Derivations).	**8hrs**
Module - III **DC Machines:** **DC Generator**: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical. **DC Motor:** Principle of operation, back emf and its significance. Torque equation, types of motors, Applications of DC motors. Simple numerical. 3-point starter.	**8hrs**
Module - IV **Transformers:** Necessity of transformer, principle of operation, Types and construction of singlephase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical. Three-phase induction **Motors:** Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance simple numerical.	**8hrs**
Module – V **Domestic Wiring:** Requirements, Types of wiring: casing, capping. Two way and three way control of load. **Electricity Bill**: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. **Equipment Safety measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. **Personal safety measures:** Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	**8hrs**

Reference books:

8. J P Tiwari," Basic Electrical Engineering", New age Publications, 2nd edition, 2011.
9. Rajendra Prasad "Fundamentals of Electrical Engineering", PHI 3rd edition, 2014.
10. B L Theraja& A K Theraja" Electrical Technology", Vol 1 , 2nd edition.
11. B L Theraja& A K Theraja" ABC of Electrical Engineering", 2nd edition.
12. D.P. Kothari and Nagrath "Theory and Problems in electrical Engineering", PHI edition 2011.
13. V. N. Mittal and Arvind Mittal;, " Basic Electrical Engineering" McGraw Hill.
14. R.V. Srinivasa Murthy "Basic Electrical Engineering" Sanguine Technical Publisher2004.

Course outcomes: On completion of the course, the student will have the ability to:

Course Code	**CO's**	**Course Outcome (CO)**
22ESC142/ 242	**CO1**	Understand the concepts of various energy sources and Electric circuits.
	CO2	Apply the basic Electrical laws to solve circuits.
	CO3	Discuss the construction and operation of various Electrical Machines.
	CO4	Identify suitable Electrical machine for practical implementation.
	CO5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.

Professional Writing Skills in English		
Subject code	**22PWS16/26**	Credit: 0
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 .5hours

MODULES	TeachingHours
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	3 hours
Module-II **Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction andConclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	3 hours
Module-III **Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error& Sentence Improvement, Cloze Test and Theme Detection Exercises.	3 hours
Module -IV **Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	3 hours
Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and itsimportance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	3 hours

Text book:

11) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
12) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].

Reference books:

26) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
27) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
28) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
29) **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
30) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

Course outcome (Course Skill Set)

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills.
CO5	To learn about Techniques of Information Transfer through presentation in different level.

Indian Constitution		
Subject code	**22ICO17/27**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	3 hours
Module-II Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.	3 hours
Module-III Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	3 hours
Module -IV Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	3 hours
Module-V State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3 hours

Text book:

9. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
10. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

Reference books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

Course outcome (Course Skill Set)

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

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Scientific Foundations of Health		
Subject code	**22SFH18/28**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.	3 hours
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components forhealth, Wellness and physical function, How to avoid exercise injuries.	3 hours
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.	3 hours
Module -IV **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictivepeople and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.	3 hours
Module-V **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.	3 hours

Text book:

16. **"Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU-University Website.**
17. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
18. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference books:

21. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
22. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles,McGraw Hill Education (India) Private Limited - Open University Press.
23. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
24. **Scientific Foundations of Health (Health & Welness) - General Books** published for university andcolleges references by popular authors and published by the reputed publisher.

Course outcome (Course Skill Set)

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

P.D.A College of Egineering Kalburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education(OBE)and Choice Based Credit System(CBCS) (Effective from the academic year 2022-23)

I Semester (Mechanical Engineering Stream) Mech, /EE **(Physics Group)**

Sl. No	Course and CourseCode		CourseTitle	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIEMarks	SEEMarks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATM11	Mathematics for ME streamI	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYM12	Physics for ME Stream	PHY	2	2	2	0	03	50	50	100	04
3	ESC	22EME23	Elements of mechanical engineering	Respective Engg dept	2	2	0	0	03	50	50	100	03
4	ESC-I	22ESC145	Introduction to C Programming	ive Engg dept	3	0	0	0	03	50	50	100	03
5.	PLC-I	22ETC15X	**Emerging Technology Courses**		2	0	2	0	03	50	50	100	03
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	1.5	50	50	100	01
8	AEC/SDC	22IDT28	Innovation and Design Thinking	Any Dept	1	0	0	0	01	50	50	100	01
				TOTAL						400	400	**800**	**20**

P.D.A College of Engineering Kalaburagi (Autonomous Institution)

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE)and Choice Based Credit System (CBCS) (Effective from the academic year 2022-23)

II Semester (Mechanical Engineering Stream) Mech, /EE **(Chemistry Group)**

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory	Tutorial	Practical/	SDA	Duration in hours	CIEMarks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATM21	Mathematics for ME Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHEM22	Chemistry for Civil Engg Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED23	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC241	Introduction to Civil Engineering	Respective EnggDept	3	0	0	0	03	50	50	100	03
5	ETC-I	22PLC25X	Programming Language courses I & II		3	0	0	0	03	50	50	100	03
6	AEC	22PWS26	Professional writing skills in iEnglish	Humanities	1	0	0	0	1.5	50	50	100	01
7	HSMS	22ICO17/27	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	22SFH28	Scientific Foundations of Health	AnyDept	1	0	0	0	01	50	50	100	01
				TOTAL						**400**	**400**	**800**	**20**

Course Title: **Mathematics-I for Mechanical Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	**22MATM11**	**CIE Marks**	**50**
Credits	**04**	**SEE Marks**	**50**
Course Type	**Integrated**		
Contact Hours/Week (L-T-P)	**2-2-2**	**Total Marks**	**100**
Contact Hours of Pedagogy	**42 hours Theory +10 Lab slots**	**Exam Hours**	**03**

Module-1 Calculus (5L+3T)

Introduction to polar coordinates and curvature relating to Mechanical engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, and angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems.

Self-study: Center and circle of curvature, evolutes and involutes.

Applications: Applied Mechanics, Structural design and paths, Strength of materials, Elasticity.

(RBT Levels: L1, L2 and L3)

Module-2 Series Expansion and Multivariable Calculus (6L+3T)

Introduction to series expansion and partial differentiation in the field of Mechanical engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms : L-Hospital's rule, problems.

Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables – Simple Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

Applications: Computation of stress and strain, Errors and approximations, Estimating the critical points and extreme values**(RBT Levels: L1, L2 and L3)**

Module-3 Ordinary Differential Equations (ODEs) of first order (6L+2T)

Introduction to first-order ordinary differential equations pertaining to the applications for Mechanical engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on $\frac{1}{\mathrm{N}}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{\mathrm{M}}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$

Orthogonal trajectories and Newton's law of cooling.

Nonlinear differential equations: Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations - Problems**.**

Self-Study: Applications of ODEs in Mechanical Engineering problems like vibration problems, solution of non-linear ODE by the method of solvable for x and y.

Applications: Rate of Growth or Decay, Conduction of heat.**(RBT Levels: L1, L2 and L3)**

Module-4 Integral Calculus (6L+3T)

Introduction to Integral Calculus in Mechanical Engineering applications.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions. Problems.

Self-Study: Volume by triple integration, Center of gravity.

Applications: Applications to mathematical quantities (Area, Surface area, Volume), Analysis of probabilistic models.**(RBT Levels: L1, L2 and L3)**

Module-5 Linear Algebra (5L+3T)

Introduction of linear algebra related to Mechanical Engineering applications.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector.

Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications: Structural Analysis, Balancing equations.**(RBT Levels: L1, L2 and L3)**

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigenvectors and find the largest and smallest eigen value by Rayleigh power method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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

CO 1	Apply the knowledge of calculus to solve problems related to polar curves
CO 2	Learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 3	Analyze the solution of linear and nonlinear ordinary differential equations
CO 4	Apply the knowledge of multiple integrals to compute area and volume.
CO 5	Make use of matrix theory for solving for system of linear equations and compute eigen values and eigen vectors. Familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/SCILAB

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	**Physics for ME Stream**		
Course Code:	**22PHYM12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab slots	Credits	04

Module-1 (8 Hours)

Module -I: Oscillations and Shock waves:

Oscillations: Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Sprigs: Stiffness Factor and its Physical Significance, Series and Parallel combination of springs (Derivation), Types of Springs and their applications. Theory of Damped oscillations (Qualitative), Types of Damping (Graphical Approach). Engineering applications of Damped oscillations, Theory of Forced oscillations (Qualitative), Resonance, Sharpness of resonance. Numerical Problems.

Shock waves: Mach number and Mach Angle, Mach Regimes, Definition and Characteristics of Shock waves, Construction and working of Reddy Shock tube, Applications of Shock Waves, Numerical problems.

Pre-requisites: Basics of Oscillations

Self-learning: Simple Harmonic motion, Differential equation for SHM

Module-2 (8 Hours)

Elasticity

Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio. Beams, Bending moment and derivation of expression, Cantilever and I section girder and their Engineering Applications, Elastic materials (qualitative). Failures of engineering materials - Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), Numerical problems.

Pre requisites: Elasticity, Stress & StrainSelf-learning: Stress-Strain Curve

Module-3 (8 Hours)

Thermoelectric materials and devices:

Thermo emf and thermo current, Seeback effect, Peltier effect, Seeback and Peltier coefficients, figure of merit (Mention Expression), laws of thermoelectricity. Expression for thermo emf in terms of T1 and T2, Thermo couples, thermopile, Construction and Working of Thermoelectric generators (TEG) and Thermoelectric coolers (TEC), low, mid and high temperature thermoelectric materials, Applications: Exhaust of Automobiles, Refrigerator, Space Program (RTG), Numerical Problems

Pre requisites: Basics of Electrical conductivitySelf-learning: Thermo emf and thermo current

Module-4 (8 Hours)

Photonics:

LASER

Properties of a LASER Beam, Interaction of Radiation with Matter, LASER action, Population Inversion, Metastable State, Requisites of a LASER System, ND YAG LASER, LASER Range Finder, LIDAR, Cutting, Drilling, Welding and Surface hardening.

Optical Fiber

Principle and Construction of Optical Fibers, Acceptance angle and Numerical Aperture (NA), Expression for NA, Modes of Propagation, Attenuation and Fiber Losses, Fiber Optic Displacement Sensor, Fiber Optic Temperature Sensor, Numerical Problems

Pre requisite: Properties of light.

Self-learning: Total Internal Reflection.

Module-5 (8 Hours)

Material Characterization and Instrumentation Techniques:

Introduction to nano materials: Nanomaterial and nanocomposites. Principle, construction and working of X-ray Diffractometer, Crystallite size determination by Scherrer equation, Atomic Force Microscopy (AFM): Principle, construction, working and applications, X-ray photoelectron spectroscopy(XPS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Numerical Problems.

Pre requisites: Quantum MechanicsSelf-learning: Crystallites

Course outcome (Course Skill Set)

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

CO1 **Elucidate** the concepts in oscillations, waves, elasticity and material failures

CO2 **Summarize** the fundamentals of Thermoelectric materials and their application

CO3 **Discuss** The principles photonic devices and their application relevant to mechanical engineering

CO4 **Explain** the various material characterization techniques

CO5 **Practice** working in groups to conduct experiments in physics and **perform** precise and honest measurements.

Laboratory Component:

Any Ten Experiments have to be completed from the list of experimentsNote: The experiments have to be classified into

e) Exercise

f) Demonstration

g) Structured Inquiry

h) Open Ended

Based on the convenience classify the following experiments into above categories.

Select at least onesimulation /spreadsheet activity.

List of Experiments

1. Determination of Young's modulus of the material of the given bar Uniform Bending.
2. Determination of Rigidity modulus of the Material of the wire using Torsional Pendulum.
3. Study of Forced Mechanical Oscillations and Resonance.
4. Study of the frequency response of Series & Parallel LCR circuits.
5. Determination of Fermi Energy of the given Conductor.
6. Determination of Resistivity by Four Probe Method.
7. Determination of effective spring constant of the given springs in series and parallel combinations.

8. Determination of Young's modulus of the material of the given bar Single Cantilever.
9. Determination of the Moment of Inertia of the given irregular body using torsional pendulum.
10. Determination of Wavelength of Laser using Diffraction Grating.
11. Determination of Acceptance angle and Numerical Aperture of the given Optical Fiber.
12. Determination of the Radius of Curvature of the given Plano Convex Lens by setting Newton's Rings.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Application of Statistics using Spread Sheets.
16. PHET Interactive Simulations
17. Flywheel
18. Interference of Air wedge

:*(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)*

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

13. Vibrations and Waves (MIT introductory Physics Series), A P French, CBS, 2003 Edition
14. Timoshenko, S. and Goodier J.N. "Theory of Elasticity", 2nd Edition, McGraw Hill Book Co, 2001.
15. Sadhu Singh, "Theory of Elasticity", Khanna Publishers, 1997
16. Mechanical Properties of Engineered Materials by Wole Soboyejo, CRC Press; 1st edition, 2002
17. Heat & Thermodynamics and Statistical Physics(XVIII-Edition) – Singhal, Agarwal & Satyaprakash – PragatiPrakashan, Meerut, 2006. 4
18. Heat and Thermodynamics (I-Edition) – D.S. Mathur - S. Chand & Company Ltd., New-Delhi, 1991
19. Heat and Thermodynamics, Brijlal & Subramanyam, S. Chand & Company Ltd., New-Delhi.
20. Physics of Cryogenics by Bahman Zohuri, Elsevier, 2018
21. Materials Characterization Techniques-Sam Zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008.
22. Characterization of Materials- Mitra P.K . Prentice Hall India Learning Private Limited.
23. Nanoscience and Nanotechnology: Fundamentals to Frontiers – M.S. Ramachandra Rao & Shubra Singh, WileyIndia Pvt Ltd.
24. Nano Composite Materials-Synthesis, Properties and Applications, J. Parameswaranpillai, N. Hameed, T.Kurian, Y. Yu, CRC Press.

Shock waves made simple by Chintoo S Kumar, K Takayama and K P J Reddy: Willey India Pvt. Ltd,Delhi,2014

Course Title:	ELEMENTS OF MECHANICAL ENGINEERING		
Course Code:	22EME13/23	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Module-1 (8 hours)

Introduction to Mechanical Engineering (Overview only):
Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies indifferent sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Steam Formation and Application:
Modes of heat transfer, Steam formation, Types of steam, Steam properties and applications of steam (simple numerical problems).**Energy Sources and Power Plants:**
Basic working principles of Hydel power plant, Thermal power plant, nuclear power plant, Solar power plant, Tidal power plant and Wind power plant.

Module-2 (8 hours)

Machine Tool Operations:
Lathe: Principle of working of a center lathe, lathe operations: Turning, facing, knurling, threadcutting, taper turning by swivelling the compound rest,
Drilling Machine: Working of simple drilling machine, drilling operations: drilling, boring, reaming,tapping, counter sinking, counter boring, **Milling Machine**: Working and types of milling machine, milling operations: plane milling, end milling and slot milling. (No sketches of machine tools, sketches to be used only for explaining the operations).
Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantagesand applications of CNC, 3D printing.

Module-3 (8 hours)

Introduction to IC Engines: Components and working principles, 4-Stroke Petrol and Diesel engines, Application of IC Engines, performance of IC engines (Simple numerical). **Introduction to Refrigeration and Air Conditioning**: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner & Applications of air Conditioners

Module-4 (8 hours)

Mechanical Power Transmission:
Gear Drives: Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)
Belt Drives: Introduction, Types of belt drives (Flat and V-Belt Drive), length of the belt and tensions ratio (simple numerical problems) **Joining Processes**: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding, MIG welding and Fusionwelding.

Module-5 (8 hours)

Insight into future mobility technology; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.
Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing and assembly andinspection.

CO1 Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources

CO2 Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.

CO3 Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics

CO4 Determine the condition of steam and its energy, performance parameters of IC engines, velocity ratio and power transmitted through power transmission systems.

CO5 Explain the Working Principle of EV vehicles and concepts of Mechatronics and Robotics

Suggested Learning Resources:
Test Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

22. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008
23. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, Media Promotersand Publishers Pvt. Ltd., 2010.

Reference Books

1. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012
2 Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rdEd., 2003.
2. 3. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1

Course Title:	Introduction to C Programming		
Course Code:	22ESC145/245	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	TeachingHours
Module-I **Algorithms, Flowcharts, Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output:** Arithmetic operators,relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	8 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	8 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	8 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	8 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	8 hours

Text book:

24. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

25.Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017

26.Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.

27.Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.

28.Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs – 22ESC145/245

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
      +   +
    +   +   +
      +   +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even.

ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers.

iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same.

ii) Read float elements and display the same.

iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

51. C Program to find Mechanical Energy of a particle using $E = mgh+1/2\ mv^2$.
52. C Program to convert Kilometers into Meters and Centimeters.
53. C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
54. Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
55. Implement Matrix multiplication and validate the rules of multiplication.
56. Compute sin(x)/cos(x) using Taylor series approximation. Compare you result with the built-in library function. Print both the results with appropriate inferences.
57. Sort the given set of N numbers using Bubblesort.
58. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
59. Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
60. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers

Communicative English		
Subject code	**22ENG16**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1.5 hours

MODULES	TeachingHours
Module-I **Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.	3 hours
Module-II **Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants andvowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.	3 hours
Module-III **Basic English Communicative Grammar and Vocabulary PART - I :**Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words,Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	3 hours
Module -IV **Basic English Communicative Grammar and Vocabulary PART - II:**Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence ofTenses (Rules in use of Tenses) and Exercises on it.	3 hours
Module-V **Communication Skills for Employment :**Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises. **Self-learning: Abrasives**: Introduction, classification, properties and application of silicon carbide (carborandum).	3 hours

Text book:

13) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
14) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference books:

31. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
32. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
33. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
34. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
35. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

Course outcome (Course Skill Set)

At the end of the course Communicative English (22ENG16) the student will be able to:

CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KSK17 / 27	**SAMSKRUTHIKA KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 - 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)

1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ
2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ
3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ

ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)

1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.
2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು
   ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು
3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಅಯ್ದ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)

1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್
2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ

ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)

1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

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

CO1	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
CO2	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
CO3	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO4	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
CO5	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

University Prescribed Textbook :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,
ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,
ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನಪತ್ರಿಕೆ ಇರುತ್ತದೆ.
2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.
4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

Subject Code	Subject	Stream	Th– Tut-Pr	Credits
22KBK17 / 27	**BALAKE KANNADA**	**Humanities and Social Sciences (H.S.S)**	**1 - 0 – 0**	**01**

CIE : 50 **SEE : 50** **SEE : 1 hours 30 Minutes** **Total : 15 Hours**

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22K**B**K17/27) will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

CO1	To understand the necessity of learning of local language for comfortable life.
CO2	To speak, read and write Kannada language as per requirement.
CO3	To communicate (converse) in Kannada language in their daily life with kannada speakers.
CO4	To Listen and understand the Kannada language properly.
CO5	To speak in polite conservation.

Module - 1 **(03 hours of pedagogy)**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2	(03 hours of pedagogy)
1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - **Possessive forms of nouns, dubitive question and Relative nouns** 2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು **Qualitative, Quantitative and Colour Adjectives, Numerals** 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) –**Predictive Forms, Locative Case**	
Module - 3	**(03 hours of pedagogy)**
1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - **Dative Cases, and Numerals** 2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು **-Ordinal numerals and Plural markers** 3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –**Defective/Negative Verbs & Colour Adjectives**	
Module- 4	**(03 hours of pedagogy)**
1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು **Permission, Commands, encouraging and Urging words (Imperative words and sentences)** 2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು **Accusative Cases and Potential Forms used in General Communication** 3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs 4. ಹೋಲಿಕೆ (ತರತಮ) , ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words	
Module - 5	**(03 hours of pedagogy)**
1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs 2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms 3. **Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation**	

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಭಾಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

==========

3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

Pattern of question paper

7. SEE Paper shall be set for 50 questions, each carrying 1 mark. The pattern of the question paper is MCQ

INNOVATION and DESIGN THINKING			
Subject code	21IDT18/28	Credit: 01	
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks	
Total hours: 25	CIE: 50 Marks	SEE: 2 hours	

MODULES		Hours
Module-I **PROCESS OF DESIGN** **Understanding Design thinking** Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping		
Teaching-Learning Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
Module-II **Tools for Design Thinking** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design		
Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-III **Design Thinking in IT** Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenariobased Prototyping		
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module -IV **DT For strategic innovations** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.		
Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-V Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		
Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

Text book:

24. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.
25. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.
26. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
27. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.

Reference books:

13. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
14. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

Course outcome (Course Skill Set) At the end of the course the student will be able to:

CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through differenttechnique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

Course Title: **Mathematics-II for Mechanical Engineering stream**
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	**22MATM21**	**CIE Marks**	**50**
Credits	**04**	**SEE Marks**	**50**
Course Type	**Integrated**		
Contact Hours/Week (L-T-P)	**2-2-2**	**Total Marks**	**100**
Contact Hours of Pedagogy	**42 hours Theory +10 Lab slots**	**Exam Hours**	**03**

Module-1 Vector Calculus (6L+3T)

Introduction to Vector Calculus in Mechanical Engineering applications.
Vector Differentiation: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.
Vector Integration: Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stoke's theorem. Problems.
Self-Study: Volume integral and Gauss divergence theorem.
Applications: Heat and mass transfer, oil refinery problems, environmental engineering. Analysis of streamlines, velocity and acceleration of a moving particle.**(RBT Levels: L1, L2 and L3)**

Module-2 Ordinary Differential Equations of higher order (6L+2T)

Importance of higher-order ordinary differential equations in Mechanical Engineering applications.
Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations- Problems.
Self-Study: Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients.
Applications: Oscillations of a spring, Transmission lines, Highway engineering.**(RBT Levels: L1, L2 and L3)**

Module-3 Partial Differential Equations (PDEs) (5L+3T)

Importance of partial differential equations for Civil Engineering applications
Formation of PDE's by elimination of arbitrary constants and functions. Solution of nonhomogeneous PDE by direct integration. Homogeneous PDEs involving derivatives with respect to one independent variable only. Solution of Lagrange's linear PDE. Derivation of one-dimensional heat equation and wave equation.
Self-Study: Solution of one-dimensional heat equation and wave equation by the method of separation of variables.
Applications: Design of structures (vibration of rod/membrane)**(RBT Levels: L1, L2 and L3)**

Module-4 Numerical Methods -1 (6L+3T)

Importance of numerical methods for discrete data in the field of Mechanical Engineering.
Solution of algebraic and transcendental equations: Regula-Falsi and Newton-Raphson methods (only formulae). Problems. Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's interpolation formulae (All formulae without proof). Problems
N**umerical integration**:Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof),Examples
Self-Study: Bisection method, Lagrange's inverse Interpolation**.**
Applications: Estimating the approximate roots, extremum values, Area, volume, and surface area. Finding approximate solutions to Mechanical engineering problems. **(RBT Levels: L1, L2 and L3)**

Module-5 Numerical Methods -2 (5L+3T)

Introduction to various numerical techniques for handling Mechanical Engineering applications.

Numerical Solution of Ordinary Differential Equations (ODE's): Numerical solution of ordinary differential equations of first order and first degree – Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor-corrector formula (No derivations of formulae). Problems.

Self-Study: Adam-Bashforth method.

Applications: Finding approximate solutions to ODE related to Mechanical engineering fields

.
(RBT Levels: L1, L2 and L3

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)
10 lab sessions + 1 repetition class + 1 Lab Assessment

1	Finding gradient, divergent, curl and their geometrical interpretation

2	Verification of Green's theorem
3	Solutions of Second-order ordinary differential equations with initial/boundary conditions
4	Solution of a differential equation of oscillations of a spring/deflection of a beam with different loads
5	Solution of one-dimensional heat equation and wave equation
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7	Interpolation/Extrapolation using Newton's forward and backward difference formula
8	Computation of area under the curve using Trapezoidal, Simpson's $(1/3)^{rd}$ and $(3/8)^{th}$ rule
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
10	Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method

.**Suggested software's:** Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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

CO 1	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
CO 2	Analyze the solution of higher order ordinary differential equations..
CO 3	Demonstrate partial differential equations and their solutions for physical interpretations.
CO 4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
CO 5	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart: "**Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Title:	Chemistry for MechanicalEngineering stream		
Course Code:	**22CHEM12/22**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)[1]	2:2:2:0	ExamHours	03+02
Total Hours of Pedagogy	40 hours Theory +10 to12 Lab slots	Credits	04

Module-1: Energy; Source, Conversion and Storage (8 hr)

Fuels: Introduction, calorific value, determination of calorific value using bombcalorimeter, numerical problems on GCV and NCV.
Green fuels: Introduction, power alcohol, synthesis and applications of biodiesel.
High energy fuels: Production of hydrogen by electrolysis of water and its advantages. **Energy devices:** Introduction, construction, working, and applications of Li-ion, Na-ion,Li-MnO2 battery and methanol-oxygen fuel cell.
Self-learning: Plastic recycling to fuels and its monomers or other useful products.

Module-2: Corrosion Science and Engineering (8 hr)

Corrosion: Introduction, mechanism of electrochemical corrosion with iron as an example, types (differential metal and aeration), Stress corrosion. Factors affecting corrosion (EMF, Temperature, pH, relative area of anode and cathode and polarization).
Corrosion control: Metal coating-galvanization, surface conversion coating-anodization and cathodic protection-sacrificial anode method. Corrosion testing by weight loss method.
Metal finishing: Introduction, technological importance. Electroplating: Introduction, Electroplating of chromium. Electroless plating: Introduction,electroless plating of nickel.
Self-learning: Electroless plating of copper in the manufacture of PCB.

Module-3: Macromolecules for Engineering Applications (8 hr)

Polymers: Introduction, methods of polymerization (Condensation and Freeradical), Techniques of addition polymerization, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC) and polystyrene.
Conducting polymers – synthesis and conducting mechanism of Polyacetylene.
Fibers: Introduction, synthesis, properties and industrial applications of Kevlar and Polyester.
Plastics: Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon.
Polymer composites: Introduction, properties and applications of fiber reinforcedpolymers composites (FRPC).
Self-learning: Biodegradable polymer: Introduction, synthesis, properties and applications of polylactic acid (PLA), introduction, classification, properties and application of lubricants.

Module-4: Phase Rule and Analytical Techniques (8 hr)

Phase rule: Introduction, Definition of terms: phase, components, degree of freedom, phase rule equation. Phase diagram: Two component-lead-silver system.
Analytical techniques: Introduction, principle, instrumentation of potentiometric sensors; its application in the estimation of iron, Coductometric Titration of strong acid versus strong base, Optical sensors (colorimetry); its application in the estimation of the copper, pH-sensor (Glass electrode); its application in the determinationof pH of beverages.
Self-learning: Determination of viscosity of biofuel and its correlation with temperature.

Module-5: Water technology and Nanotechnology (8 hr)

Water technology: Introduction, sources and nature of impurities of water, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by Lime-Soda Process, determination of COD, numerical problems. Purification of water by Reverse osmosis and chlorination methods.
Nanotechnology: Introduction,properties and engg.application of carbon nanotubes,grapheme and nanomaterials for water treatment(metal oxide)
Self-learning: Introduction,classification, properties and application of silicon carbide.

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:

A1. Synthesis of polyurethane
A2. Preparation of urea formaldehyde resinA3. Synthesis of iron oxide nanoparticles A4. Determination of acid value of biofuel

B – Exercise (compulsorily any 4 to be conducted):

B1. Conductometric estimation of acid mixture
B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$
B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss methodB5. Estimation of total hardness of water by EDTA method

C – Structured Enquiry (compulsorily any 4 to be conducted):

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)
C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method C4. Estimation of Sodium present in soil/effluent sample using flame photometry
C5. Determination of Chemical Oxygen Demand (COD) of industrial waste water sample

D – Open Ended Experiments (any two):

D1. Estimation of percentage of iron in steel
D2. Electroplating of desired metal on substrateD3. Synthesis of biodiesel
D4. Synthesis of Aluminium Oxide nano particle

CO1. Identify the terms andapplications processes involved in scientific and engineering
CO2. Explain the phenomena of chemistry to describe the methods of engineering processes
CO3. Solve the problems in chemistry that are pertinent in engineering applications
CO4. Apply the basic concepts of chemistry to explain the chemical properties andprocesses
CO5. Ayze properties and multidisciplinary situations processes associated with chemical substances in

Suggested Learning Resources:
Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

7. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
8. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
9. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
10. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
11. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
12. Engineering Chemistry – I, D. Grour Krishana, Vikas Publishing

7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.

29. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. InternationalPublishing house. 2nd Edition, 2016.
30. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
31. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSCPublishing, 2005.
32. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
33. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
34. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley–Blackwell , 2012
35. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, Elzbieta Frackowiak, Wiley-VCH; 1st edition, 2013.
36. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESSPRESS Inc., 2017. Dr. H. Panda,
37. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: TheNational Academies Press. doi: 10.17226/4782.
38. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher,Bengaluru, ISBN 978-93-85155-70-3, 2022
39. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley& Sons, 2010
40. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, NiraliPrakashan, 2020
41. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch SeventhEdition, Cengage Learning, 2020
42. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers,4th Edition, 2021
43. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
44. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition, 2002.
45. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition 2014
46. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
47. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & PushpaIyengar., Subash Publications, 5th Edition, 2014
48. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, FourthReprint, 2015.
49. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,

Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Course Title:	**COMPUTER AIDED ENGINEERING DRAWING**		
Course Code	**22CED13/23**	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

Module-1

Introduction: ***for CIE only***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections: Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

Application on projections of Lines & Planes (For CIE only)

Module-2

Orthographic Projection of Solids:

Orthographic projection of right regular solids (**Solids Resting on HP only**): Prisms & Pyramids (square, pentagon, hexagon), Cylinders, Cones, Cubes .

Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).

Module-3

Isometric Projections:

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones andspheres. Isometric projection of combination of two simple solids.

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components.

Introduction to drawing views using 3D environment (For CIE only).

Module-4

Development of Lateral Surfaces of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Module-5

Multidisciplinary Applications & Practice ***(For CIE Only):***

Free hand Sketching; True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts todimensions etc

Electric Wiring and lighting diagrams; Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

Basic Building Drawing; Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges,trusses using Auto CAD or suitable software,

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts: Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or anysuitable software.

Course Outcomes

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

CO 1. Draw and communicate the objects with definite shape and dimensions

CO 2. Recognize and Draw the shape and size of objects through different views

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

Introduction To Civil Engineering

Subject code	22ESC141/241	Credit: 03
Hours/Week:	3 hours. (Theory)	SEE: 50 Marks
Total hours: 42	CIE: 50 Marks	SEE: 3 hours

MODULES	Hours
Module-I Introduction to Civil Engineering, Scope of different field of Civil Engineering — Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering. Types of infrastructure, Role of Civil Engineer in the infrastructural development, Effect of infrastructural facilities on socio — economic development of a country. Roads: Types of roads, Components and their functions, Bridges and Dams: Different types with simple sketches.	8 hours
Module-II Introduction to Engineering Mechanics: Basic idealizations — Particle, Continuum, Rigid body and Point force, Newton's laws of motion Definition of force, Introduction to SI units, Elements of a force, Classification of force and force system, Principles physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces, Resolution of forces, composition of forces, composition and resolution of coplanar concurrent force system, Numerical examples on composition and resolution coplanar concurrent force system. Moment of a force, Couple system, Equivalent force couple system. Numerical Problems on moment of force and couple system, equivalent force couple systems.	10 hours
Module-III Composition of coplanar non- concurrent force system, Varignon's Principle of moment, Numerical Problems on composition of coplanar non-concurrent force system. Equilibrium of force — Definition of Equilibrant, free body diagram, Condition of static equilibrium for different force system, Lami's theorem, and numerical problems on above.	10 hours
Module -IV Types of supports, types of loads, concept of statically determinate and indeterminate types of beams, numerical problems on equilibrium of coplanar non — concurrent force system and support reactions for statically determinate beams. Friction: Types of friction, limiting friction, angle of Friction, angle of repose, Laws of static friction, Impending motion on horizontal and inclined planes, Wedge friction, Ladder friction, numerical problems.	12 hours
Module-V Centroid of planes figures: Locating the Centroid of triangle, semicircle, quadrant of a circle and sector of a circle using method of integration, Centroid of simple built-up sections and composite areas, numerical problems. Moment of Inertia of an area, rectangular moment of inertia, polar moment of inertia, Radius of gyration, Perpendicular axis theorem, Parallel axis theorem, Moment of inertia of rectangular, Circular, Triangular, Semi - circular, and quadrant areas from method of integration, Moment of inertia of Composite areas with above elementary areas, numerical problems.	12 hours

Text book:

1. S.S. Bhavikatti, "Elements of Civil Engineering", (IV edition), Vikas Publishing House Pvt.Ltd., New Delhi.
2. Jagadeesh T.R. and Jayaram, "Elements of Civil Engineering", Sapna Book House, Bangalore.

Reference books:

1. Timoshenko and Young, "Engineering Mechanics", McGraw-Hill Book Company, New Delh.
2. Ferdinand P. Beer and E.Russel Johnston Jr., "Mechanics for Engineers: Statics", McGraw-Hill Book Company, New York.
3. K.L.Kumar, "Engineering Mechanics", Tata McGraw-Hill Publishing Company, New Delhi.

Professional Writing Skills in English		
Subject code	**22PWS16/26**	Credit: 0
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 .5hours

MODULES	**TeachingHours**
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	3 hours
Module-II **Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction andConclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.	3 hours
Module-III **Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error& Sentence Improvement, Cloze Test and Theme Detection Exercises.	3 hours
Module -IV **Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.	3 hours
Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and itsimportance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.	3 hours

Text book:

13) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
14) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].

Reference books:

31) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
32) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
33) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
34) **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
35) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

Course outcome (Course Skill Set)

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills.
CO5	To learn about Techniques of Information Transfer through presentation in different level.

Indian Constitution		
Subject code	**22ICO17/27**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to theIndian constitution, Making of the Constitution, Role of the Constituent Assembly.	3 hours
Module-II Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.	3 hours
Module-III Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive: Parliamentary System, Union Executive – President, PrimeMinister, Union Cabinet.	3 hours
Module -IV Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India,Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.	3 hours
Module-V State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3 hours

Text book:

11. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
12. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

Reference books:

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, andet al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

Course outcome (Course Skill Set)

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

CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India.
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Scientific Foundations of Health		
Subject code	**22SFH18/28**	Credit: 01
Hours/Week:	1 hour. (Theory)	SEE: 50 Marks
Total hours: 15	CIE: 50 Marks	SEE: 1 hours

MODULES	TeachingHours
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.	3 hours
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components forhealth, Wellness and physical function, How to avoid exercise injuries.	3 hours
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.	3 hours
Module -IV **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictivepeople and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.	3 hours
Module-V **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.	3 hours

Text book:

19. **"Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU-University Website.**
20. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
21. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference books:

25. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
26. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles,McGraw Hill Education (India) Private Limited - Open University Press.
27. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
28. **Scientific Foundations of Health (Health & Welness) - General Books** published for university andcolleges references by popular authors and published by the reputed publisher.

Course outcome (Course Skill Set)

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

Engineering Science Courses (ESC-I)

Introduction To Civil Engineering		
Subject code	22ESC141/241	Credit: 03
Hours/Week:	3 hours. (Theory)	SEE: 50 Marks
Total hours: 42	CIE: 50 Marks	SEE: 3 hours

MODULES	**Hours**
Module-I Introduction to Civil Engineering, Scope of different field of Civil Engineering — Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering. Types of infrastructure, Role of Civil Engineer in the infrastructural development, Effect of infrastructural facilities on socio — economic development of a country. Roads: Types of roads, Components and their functions, Bridges and Dams: Different types with simple sketches.	8 hours
Module-II Introduction to Engineering Mechanics: Basic idealizations — Particle, Continuum, Rigid body and Point force, Newton's laws of motion Definition of force, Introduction to SI units, Elements of a force, Classification of force and force system, Principles physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces, Resolution of forces, composition of forces, composition and resolution of coplanar concurrent force system, Numerical examples on composition and resolution coplanar concurrent force system. Moment of a force, Couple system, Equivalent force couple system. Numerical Problems on moment of force and couple system, equivalent force couple systems.	10 hours
Module-III Composition of coplanar non- concurrent force system, Varignon's Principle of moment, Numerical Problems on composition of coplanar non-concurrent force system. Equilibrium of force — Definition of Equilibrant, free body diagram, Condition of static equilibrium for different force system, Lami's theorem, and numerical problems on above.	10 hours
Module -IV Types of supports, types of loads, concept of statically determinate and indeterminate types of beams, numerical problems on equilibrium of coplanar non — concurrent force system and support reactions for statically determinate beams. Friction: Types of friction, limiting friction, angle of Friction, angle of repose, Laws of static friction, Impending motion on horizontal and inclined planes, Wedge friction, Ladder friction, numerical problems.	12 hours
Module-V Centroid of planes figures: Locating the Centroid of triangle, semicircle, quadrant of a circle and sector of a circle using method of integration, Centroid of simple built-up sections and composite areas, numerical problems. Moment of Inertia of an area, rectangular moment of inertia, polar moment of inertia, Radius of gyration, Perpendicular axis theorem, Parallel axis theorem, Moment of inertia of rectangular, Circular, Triangular, Semi - circular, and quadrant areas from method of integration, Moment of inertia of Composite areas with above elementary areas, numerical problems.	12 hours

Text book:

1. S.S. Bhavikatti, "Elements of Civil Engineering", (IV edition), Vikas Publishing House Pvt.Ltd., New Delhi.
2. Jagadeesh T.R. and Jayaram, "Elements of Civil Engineering", Sapna Book House, Bangalore.

Reference books:

1. Timoshenko and Young, "Engineering Mechanics", McGraw-Hill Book Company, New Delhi.
2. Ferdinand P. Beer and E.Russel Johnston Jr., "Mechanics for Engineers: Statics", McGraw-Hill Book Company, New York.
3. K.L.Kumar, "Engineering Mechanics", Tata McGraw-Hill Publishing Company, New Delhi.

Course Title: **INTRODUCTION TO ELECTRICAL ENGINEERING**		
Course Code	**22ESC142/242**	**CIE: 50**
Number of Lecture Hours/Week	**3hours (Theory)**	**SEE: 50**
Total Number of Lecture Hours	**40**	**SEE Hours: 03**

Modules	**Hours**
Module - I **Introduction:** Conventional and non-conventional energy resources; **Power Generation:** Hydel, Nuclear, Solar & wind power generation (Block Diagram approach). **Electromagnetism:** Faraday Laws of Electromagnetic Induction, Fleming's rules, Lenz's law, types of EMF and numerical.	**8hrs**
Module - II **A.C. Fundamentals:** Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical). **Three Phase Circuits:** Advantages, three phase connections (Star & Delta) (Excluding Derivations).	**8hrs**
Module - III **DC Machines:** **DC Generator**: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical. **DC Motor:** Principle of operation, back emf and its significance. Torque equation, types of motors, Applications of DC motors. Simple numerical. 3-point starter.	**8hrs**
Module - IV **Transformers:** Necessity of transformer, principle of operation, Types and construction of singlephase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical. Three-phase induction **Motors:** Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance simple numerical.	**8hrs**
Module – V **Domestic Wiring:** Requirements, Types of wiring: casing, capping. Two way and three way control of load. **Electricity Bill**: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. **Equipment Safety measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. **Personal safety measures:** Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	**8hrs**

Question paper pattern: Total ten questions will be asked,two from each module. The student has to answer five questions, selecting at least one from each module.

Reference books:

1. J P Tiwari," Basic Electrical Engineering", New age Publications, 2nd edition, 2011.
2. Rajendra Prasad "Fundamentals of Electrical Engineering", PHI 3rd edition, 2014.
3. B L Theraja& A K Theraja" Electrical Technology", Vol 1 , 2nd edition.
4. B L Theraja& A K Theraja" ABC of Electrical Engineering", 2nd edition.
5. D.P. Kothari and Nagrath "Theory and Problems in electrical Engineering", PHI edition 2011.
6. V. N. Mittal and Arvind Mittal;, " Basic Electrical Engineering" McGraw Hill.
7. R.V. Srinivasa Murthy "Basic Electrical Engineering" Sanguine Technical Publisher2004.

Course outcomes: On completion of the course, the student will have the ability to:

Course Code	**CO's**	**Course Outcome (CO)**
22ESC142/ 242	**CO1**	Understand the concepts of various energy sources and Electric circuits.
	CO2	Apply the basic Electrical laws to solve circuits.
	CO3	Discuss the construction and operation of various Electrical Machines.
	CO4	Identify suitable Electrical machine for practical implementation.
	CO5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.

INTRODUCTION TO ELECTRONICS ENGINEERING			
Subject Code	22ECSC143/243	22BEE13/23	CIE: 50
Number of Lecture Hours/Week	3 (Theory)		SEE: 50
Total Number of LectureHours	40 CREDITS- 3		SEE Hours: 03

Module#	Teaching Hours
Module-1	**08 Hours**
Power Supplies: Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators,Output resistance and voltage regulation, Voltage multipliers. **Amplifiers:** CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes.	
Module-2	**08 Hours**
Operational amplifiers: Ideal op-amp; characteristics of ideal and practical op-amp. **Practical op-amp circuits:** Inverting and non-inverting amplifiers, voltage follower, summer, subtractor,integrator, differentiator. **Oscillators:** Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator (using op-amp), Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)	
Module-3	**08 Hours**
Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates **Combinational logic:** Introduction, Design procedure, Adders- Half adder, Full adder.	
Module-4	**08 Hours**
Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC **Sensors and Interfacing:** Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display.	
Module-5	**08 Hours**
Analog Communication Schemes: Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky) **Digital Modulation Schemes:** Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.	

Text books:

5. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015. DOI https://doi.org/10.4324/9781315737980. eBook ISBN9781315737980 2nd
6. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-2030417-84.

D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India),PrivateLimited, 2018

CO1 Design basic power supply & study concept of amplifiers.
CO2 To analyze working of op-amp with its applications & to studyoscillators.
CO3 Develop competence knowledge to construct basic digital circuit by make use of basic gate and its function.
CO4 Understand the concept of embedded system. Study role of Sensor and its interfacing.
CO5 To study various analog and digital modulation and demodulationtechniques

Course Title:	**INTRODUCTION TO MECHANICAL ENGINEERING**		
Course Code:	22ESC144/244	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Module-1 (8 hours)

Introduction to Mechanical Engineering (Overview only):
Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies indifferent sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Steam Formation and Application:
Modes of heat transfer, Steam formation, Types of steam, Steam properties and applications of steam (simple numerical problems).**Energy Sources and Power Plants:**
Basic working principles of Hydel power plant, Thermal power plant, nuclear power plant, Solar power plant, Tidal power plant and Wind power plant.

Module-2 (8 hours)

Machine Tool Operations:
Lathe: Principle of working of a center lathe, lathe operations: Turning, facing, knurling, threadcutting, taper turning by swivelling the compound rest, **Drilling Machine**: Working of simple drilling machine, drilling operations: drilling, boring, reaming,tapping, counter sinking, counter boring, **Milling Machine**: Working and types of milling machine, milling operations: plane milling, endmilling and slot milling. (No sketches of machine tools, sketches to be used only for explaining the operations). **Introduction to Advanced Manufacturing Systems:** Introduction, components of CNC, advantagesand applications of CNC, 3D printing.

Module-3 (8 hours)

Introduction to IC Engines: Components and working principles, 4-Stroke Petrol and Diesel engines, Application of IC Engines, performance of IC engines (Simple numerical).
Introduction to Refrigeration and Air Conditioning: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner & Applications of air Conditioners

Module-4 (8 hours)

Mechanical Power Transmission:
Gear Drives: Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)
Belt Drives: Introduction, Types of belt drives (Flat and V-Belt Drive), length of the belt and tensions ratio (simple numerical problems)**Joining Processes**: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding, MIG welding and Fusionwelding.

Module-5 (8 hours)

Insight into future mobility technology; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.
Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing and assembly andinspection.

CO1 Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources

CO2 Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.

CO3 Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics

CO4 Determine the condition of steam and its energy, performance parameters of IC engines, velocity ratio and power transmitted through power transmission systems. CO5 Explain the Working Principle of EV vehicles and concepts of Mechatronics and Robotics

Suggested Learning Resources:
Test Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

29. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008
30. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, MediaPromoters and Publishers Pvt. Ltd., 2010.

Reference Books

An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012

Course Title:	**Introduction to C Programming**		
Course Code:	**22ESC145/245**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	**Hours**
Module-I **Algorithms, Flowcharts, Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output:** Arithmetic operators, relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	8 hours
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	8 hours
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	8 hours
Module -IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures**Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	8 hours
Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	8 hours

Text book:

31. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– VEdition, 2016

Reference books:

32.Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017

33.Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.

34.Brian W Kernighan & Dennis M Ritchie **"** The C Programming Language", Prentice HallPublisher, Second Edition, 2004.

35.Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programmingApproach Using C.", Third edition, Thomson Learning, 2005.

Course outcome (Course Skill Set)

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

CO1	Develop Algorithm and flowcharts and understand the different data typesand Operators in C language
CO2	Identify and use proper decision /control constructs for solving differenttype of problems
CO3	Apply arrays and Strings functions to develop programs for a given problem.
CO4	Demonstrate the use of structures and apply modular programming concepts
CO5	Develop C program for real world problems using pointers and fileoperations.

List of Programs – 22ESC145/245

Practice Programs:

1.Write a C program using printf statement:

a) Print your name and Address.

b) Print the pattern:

```
        +
      +   +
    +   +   +
      +   +
        +
```

2.Write a C Program using Scanf statements

a) Read int, char and float values from the keyboard and display the same.

3.Write a c program to find :

i) Area of rectangle

ii) Area of Square

iii) Area of circle

4. Write a c program using if , if…else , nested if and else…if ladder.

i) To find whether number is odd or even.

ii) To find whether number is +ve or –ve.

iii) To find largest of two numbers.

iv) To find largest of three numbers.

5. Write a c program using while , do-while and for looping statement.

i) Print 1 to 10 numbers using all the three looping statements.

6. Write a c program using arrays:

i) Read 1 to 10 array elements and display the same.

ii) Read float elements and display the same.

iii) Read character and display the same.

7. Write c program using strings:

i. Read a string from keyboard and display the same.

Programming Assignments:

61. C Program to find Mechanical Energy of a particle using $E = mgh+1/2\ mv^2$.
62. C Program to convert Kilometers into Meters and Centimeters.
63. C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
64. Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
65. Implement Matrix multiplication and validate the rules of multiplication.
66. Compute sin(x)/cos(x) using Taylor series approximation. Compare you result with the built-in library function. Print both the results with appropriate inferences.
67. Sort the given set of N numbers using Bubblesort.
68. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
69. Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
70. Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers

Emerging Technology Courses(ETC)

GREEN BUILDING		
Subject code	22ETC15A	Credit: 03
Hours/Week:	3 hours. (Theory)	SEE: 50 Marks
Total hours: 42	CIE: 50 Marks	SEE: 3 hours

MODULES	Hours
Module-I Environmental implications of buildings energy, carbon emissions, water use, waste disposal. Introduction to green building, benefits, site selection, selection of materials.	9 hours
Module-II Resources, efficiency, Materials impacts increasing energy efficiency, recycling of industrial and building waste, biomass resources for building, use of renewable energy systems and impacts.	9 hours
Module-III Comforts in buildings, thermal, light ventilation in buildings, heat transfer characteristics in buildings, incidence of solar energy in materials for lightening and ventilation comfort.	8 hours
Module -IV Energy conservation, concepts of solar passive cooling and heating of building, low energy cooling, Case studies on residential and commercial buildings	8 hours
Module-V Water conservation, Rain water harvesting: definition, types and advantages, concepts of green composite	8 hours

Text book:

1. K.S. Jagadish, B. U. Venkataramareddy and K. S. Nanjundarao. Alternative Building Materials and Technologies. New Age International, 2007.
2. Michael Bauer, Peter Mösle and Michael Schwarz "Green Building - Guidebook for Sustainable Architecture" Springer, 2010
3. Environmental Engineering vol-II By S.K.Gerg, Khanna publications

Reference books:

1. Osman Attmann Green Architecture Advanced Technologies and Materials. McGraw Hill, 2010.
Michael F. Ashby Materials and the Environment, Elsevier, 2009.
3. Jerry Yudelson Green building Through Integrated Design.McGraw Hill, 2009.
4. Mili M. Ajumdar (Ed) Energy Efficient Building in India.Teri and Mnes, 2001 / 2002.
5. Low Energy Cooling For Sustainable Buildings. John Wiley and Sons Ltd, 2009.
6.Green My Homel: 10 Steps to Lowering Energy Costs and Reducing Your Carbon Footprint,by Dennis
C. Brewer, ISBN:9781427798411, Publisher: Kaplan Publishing, Publication Date: October 2008.
7. B. Givoni, Man, Climate and Architecture Elsevier, 1969.
8. T. A. Markus and E. N. Morris Buildings Climate and Energy. Pitman, London, 1980. ArvindKishan et al (Ed)

Course Title: **Introduction to Solar PV System**		
Course Code	**22ETC15B/22ETC25B**	**CIE: 50**
Number of Lecture Hours/Week	**3hours (Theory)**	**SEE: 50**
Total Number of Lecture Hours	**40**	**SEE Hours: 03**

Modules	**Hours**
Module – I **Solar Resource and Radiation** **An introduction to Energy Sources:** Energy consumption as a measure of Prosperity, world energy futures and energy sources and their availibity. **Solar Resource and Radiation:** Solar resources, Quantifying solar radiation, The effect of the Earth's atmosphere on solar radiation, Sun geometry, Geometry for installing solar arrays.	**8hrs**
Module – II **Solar thermal energy The solar energy option – An overview of thermal applications:** Devices for thermal collection and storage, thermal applications and some observations.	**8hrs**
Module – III **PV Industry and Technology** **PV Industry and Technology:** Semiconductor devices, Mainstream technologies, Mono crystalline silicon, Multi crystalline/polycrystalline silicon, Thin film solar cells, Contacts, Buying solar modules, Standards, Certifications, Warranties, Emerging technologies, Dye-sensitized solar cells, Sliver cells, Hetero junction with intrinsic thin layer (HIT) photovoltaic cells, Solar concentrators. **PV Cells, Modules and Arrays:** Characteristics of PV cells, Graphic representations of PV cell performance, Connecting PV cells to create a module, Specification sheets, Creating a string of modules, Creating an array, Photovoltaic array performance, Irradiance, Temperature, Shading.	**8hrs**
Module-IV **Inverters and Other System Components** **Inverters and Other System Components:** Introduction, Inverters, Battery inverters, Grid-interactive inverters, Transformers, Mainstream inverter technologies, String inverters, Multi-string inverter, Central inverter, Modular inverters, Inverter protection systems, Self-protection, Grid protection, Balance of system equipment: System equipment excluding the PV array and inverter, Cabling, PV combiner box, Module junction box, Circuit breakers and fuses, PV main disconnects/isolators, Lightning and surge protection, System monitoring, Metering, Net metering, Gross metering. Mounting Systems: Roof mounting systems, Pitched roof mounts, Pitched roof mounts for tiled roofs, Pitched roof mounts for metal roofs Rack mounts, Direct mounts, Building-integrated systems, Ground mounting systems, Ground rack mounts, Pole mounts, Sun-tracking systems, Wind loading.	**8hrs**
Module-V **Installing Grid-connected PV Systems** **Installing Grid-connected PV Systems:** PV array installation, DC wiring, Cabling routes and required lengths, Cable sizing, PV combiner box, System grounding/earthling, Inverter installation, Installation checklist, Interconnection with the utility grid, Required information for installation, Safety. **System Commissioning:** Introduction, Final inspection of system installation, Testing, Commissioning, System documentation. **System Operation and Maintenance:** System maintenance, PV array maintenance, Inverter maintenance, System integrity, Troubleshooting, Identifying the problem, Troubleshooting PV arrays, Troubleshooting underperforming systems, Troubleshooting inverters, Other common problems.	**8hrs**

Question paper pattern: Total ten questions will be asked, two from each module. The student has to answer five questions, selecting at least one from each module.

Reference books:

1. Chetan Singh Solanki, Solar Photovoltaic Technology And Systems - A Manual For Technicians, Trainers And Engineers, PHI Publication New Delhi- 2013 Edition.

2.Geoff Stapleton Susan Neill, Grid-connected Solar Electric Systems: The Earthscan Expert Handbook for Planning, Design and Installation, Routledge; 1st edition 2021.

3. Chetan Singh Solanki, Solar Photovoltaic's**:** Fundamentals, Technologies And Applications , PHI Publication New Delhi, 3rd Edition

4. GD Rai, Non Convention Sources of Energy, Khanna Publishers, New Delhi, 5th Edition

5..SP Sukhatme, JK Nayak, Solar Energy, TMH Publishing Company limited New Delhi, 3rd Edition.

Course outcomes: On completion of the course, the student will have the ability to:

Course Code	CO's	Course Outcome (CO)
22ETC15B/ 25B	**CO1**	Understand the needs of energy and discuss the solar radiation.
	CO2	Appreciate the solar thermal energy applications.
	CO3	Discuss the PV technology and Industry.
	CO4	Identify the components of PV system and Inverters.
	CO5	Understand the installation of PV system and O&M of PV systems

RENEWABLE ENERGY SOURCES			
Course Code:	22ETC15C/25C	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Module-1 (08 hours)

Introduction: INTRODUCTION: Principles of renewable energy and there types. energy and sustainable development,– Environmental Aspects of Energy Utilization– Renewable Energy Scenario in India and around the World and Potentials – Achievements / Applications

Module-2 (08 hours)

SOLAR ENERGY: Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors - Fundamentals of Solar Photo Voltaic Conversion – Solar PV Power Generation – Solar energy Applications

Module-3 (08 hours)

WIND ENERGY: Wind Data and Energy Estimation – Wind Energy Conversion Systems – Performance – Site Selection— Safety and Environmental Aspects.

BIOMASS ENERGY: Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies-fixed dome and floating type; Urban waste to energy conversion. Biomass Applications.

Module-4 (08 hours)

Tidal Power: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, advantages and limitations.

Ocean Thermal Energy Conversion: Principle of working, OTEC power stations in the world, advantages and disadvantage with OTEC.

Module-5 (08 hours)

Green Energy: Introduction, Fuel cells: Classification of fuel cells – H_2; Operating principles, Zero energy Concepts. Benefits of hydrogen energy, hydrogen production technologies (electrolysis method only), hydrogen energy storage, applications of hydrogen energy, problem associated with hydrogen energy.

Geothermal Energy. Introduction-, geothermal filed and its applications. Small Hydro-power generation.

Course outcome (Course Skill Set)

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

CO1	Describe the environmental aspects of renewable energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
CO2	Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation.
CO3	Understand the conversion principles of wind and tidal energy
CO4	Understand the concept of biomass energy resources and green energy.
CO5	Acquire the basic knowledge of ocean thermal energy conversion and hydrogen energy.

Suggested Learning Resources:

Text Books:

1. Nonconventional Energy sources, G D Rai, Khanna Publication, Fourth Edition,
2. Energy Technology, S.Rao and Dr. B.B. Parulekar, Khanna Publication.Solar energy, Subhas P Sukhatme, Tata McGraw Hill, 2nd Edition,1996.

Reference Books:

1. Principles of Energy conversion, A. W. Culp Jr.,, McGraw Hill, 1996
2. Non-Convention EnergyResources, Shobh Nath Singh, Pearson, 2018

Introduction to Internet of Things(IOT)		
Subject code	**22ETC15D/25D**	Credit: 03
Hours/Week:	3 hours. (Theory)	SEE: 50 Marks
Total hours: 40	CIE: 50 Marks	SEE: 3 hours

MODULES	**TeachingHours**
Module-I **Basics of Networking:** Introduction, Network Types, Layered network models **Emergence of IoT:** Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence ofTechnologies, IoT Networking Components Textbook 1: Chapter 1- 1.1 to 1.3 Chapter 4 – 4.1 to 4.4	8 hours
Module-II **IoT Sensing and Actuation:** Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, SensingTypes, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics. Textbook 1: Chapter 5 – 5.1 to 5.9	8 hours
Module-III IoT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies,IoT Device Design and Selection Considerations, Processing Offloading. Textbook 1: Chapter 6 – 6.1 to 6.5	8 hours
Module -IV ASSOCIATED IOT TECHNOLOGIES Cloud Computing: Introduction, Virtualization, Cloud Models, Service-Level Agreement in Cloud Computing, Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service. IOT CASE STUDIES Agricultural IoT – Introduction and Case Studies Textbook 1: Chapter 10– 10.1 to 10.6; Chapter 12- 12.1-12.2	8 hours
Module-V IOT CASE STUDIES AND FUTURE TRENDS Vehicular IoT – Introduction Healthcare IoT – Introduction, Case StudiesIoT Analytics Introduction Textbook 1: Chapter 13– 13.1; Chapter 14- 14.1-14.2; Chapter 17- 17.1	8 hours

Text book:

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, “Introduction to IoT”, Cambridge University Press 2021.
Reference:

Reference books:

1. S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0.CRC Press.
2. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”,1st Edition, VPT, 2014.
3. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013.

Course outcome (Course Skill Set)

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

CO1	Describe the evolution of IoT, IoT networking components, and addressing strategies in IoT.
CO2	Classify various sensing devices and actuator types.
CO3	Demonstrate the processing in IoT.
CO4	Explain Associated IOT Technologoes
CO5	Illustrate architecture of IOT Applications

Introduction to Cyber Security		
Subject code	**22ETC15E/25E**	Credit: 03
Hours/Week:	3 hours. (Theory)	SEE: 50 Marks
Total hours: 40	CIE: 50 Marks	SEE: 3 hours

Prerequisite: Nil

Course objectives

- To familiarize cybercrime terminologies and perspectives
- To understand Cyber Offenses and Botnets
- To gain knowledge on tools and methods used in cybercrimes
- To understand phishing and computer forensics

MODULES	TeachingHours
Module-I **Cybercrime:** Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, An Indian Perspective, Hacking and Indian Laws., Global Perspectives Textbook:1 Chapter 1 (1.1 to 1.5, 1.7-1.9)	8 hours
Module-II **Cyber Offenses:** **How Criminals Plan Them:** Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercaafe & cybercrimes. **Botnets:** The fuel for cybercrime, Attack Vector.Textbook:1 Chapter 2 (2.1 to 2.7)	8 hours
Module-III **Tools and Methods used in Cybercrime:** Introduction, Proxy Servers, Anonymizers, Phishing, Password Cracking, Key Loggers and Spyways, Virus and Worms, Trozen Horses and Backdoors, Steganography, DoS and DDOS Attackes, Attacks on Wireless networks. Textbook:1 Chapter 4 (4.1 to 4.9, 4.12)	8 hours
Module -IV **Phishing and Identity Theft:** Introduction, methods of phishing, phishing,phising techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft Textbook:1 Chapter 5 (5.1. to 5.3)	8 hours
Module-V **Understnading Computer Forensics:** Introdcution, Historical Background of Cyberforensics, Digital Foresics Science, Need for Computer Foresics, Cyber Forensics and Digital Evidence, Digital Forensic Life cycle, Chain of Custody Concepts, network forensics. Textbook:1 Chapter 7 (7.1. to 7.5, 7.7 to 7.9)	8 hours

Text book:

1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics AndLegal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, 2011, First Edition (Reprinted 2018)

Reference books:

Course outcome (Course Skill Set)

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

CO1	Explain the cybercrime terminologies
CO2	Describe Cyber offenses and Botnets
CO3	Illustrate Tools and Methods used on Cybercrime
CO4	Explain Phishing and Identity Theft
CO5	Justify the need of computer forensics

WASTE MANAGEMENT		
Subject code	22ETC15F/22ETC25F	Credit: 03
Hours/Week:	3 hours. (Theory)	SEE: 50 Marks
Total hours: 42	CIE: 50 Marks	SEE: 3 hours

MODULES	Teaching Hours
Module-I Definition of waste, classification of waste of domestic, industrial and commercial waste. Extent of generation in India, storage, transportation and disposal of waste by land filling and incineration	9 hours
Module-II Solid waste definition, necessity of safe disposal, composition, quantity, characteristics, collection and transportation, separation recycling and reusing	9 hours
Module-III Hazardous waste definition, classification, Radio Active, cradle to grave concept in waste management waste health effect of waste managements	8 hours
Module -IV E-waste definition, classification, health effects and recycling of E-waste Biomedical waste: health effects, classification segregation, storage, disposal by incineration	8 hours
Module-V Waste treatment, bioremediation, composting, land farming, bio piles, biogas plant, phytoremediation: applications merits and demerits	8 hours

Text book:

1. Environmental Engineering vol-II By S.K.Gerg, Khanna publications
2. Soil Pollution By J.C.Calvet, CBS publications

Reference books:

Introduction to Environmental Engineering by Mackenzie L.Davis.

Programming Languages Courses (PLC I &II)

Course Title:	**Introduction to Web Programming**		
Course Code:	**22PLC15A/22PLC25A**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	**Teaching Hours**
Module-I **Traditional HTML and XHTML :** First Look at HTML and XHTML, Hello HTML and XHTML World, HTML and XHTML: Version History, HTML and XHTML DTDs: The Specifications Up Close, (X)HTML Document Structure, Browsers and (X)HTML, The Rules of (X)HTML, Major Themes of (X)HTML, The Future of Markup—Two Paths?	**6 hours**
Module-II **HTML5:** Hello HTML5, Loose Syntax Returns, XHTML5, HTML5: Embracing the Reality of Web Markup, Presentational Markup Removed and Redefined, HTML5 Document Structure Changes, Adding Semantics, HTML5's Open Media Effort, Client-Side Graphics with <canvas>, HTML5 Form Changes, Emerging Elements and Attributes to Support Web Applications	6 hours
Module-III **Cascading Style Sheets (CSS) :** Introduction, CSS Overview , CSS Rules, Example with Type Selectors and the Universal Selector, CSS Syntax and Style, Class Selectors, ID Selectors, span and div Elements, Cascading, style Attribute, style Container, External CSS Files, CSS Properties, Color Properties, RGB Values for Color, Opacity Values for Color, HSL and HSLA Values for Color, Font Properties, line-height Property, Text Properties, Border Properties, Element Box, padding Property, margin Property , Case Study: Description of a Small City's Core Area.	6 hours
Module -IV **Tables and CSS, Links and Images:** Table Elements, Formatting a Data Table: Borders, Alignment, and Padding, CSS Structural Pseudo- Class Selectors, thead and tbody Elements, Cell Spanning, Web Accessibility, CSS display Property with Table Values, a Element, Relative URLs, Navigation Within a Web Page, CSS for Links, Bitmap Image Formats: GIF, JPEG, PNG, img Element, Responsive Images, Positioning Images, Shortcut Icon, iframe Element.	6 hours
Module-V **Introduction to JavaScript: Functions, DOM, Forms, and Event Handlers :** History of JavaScript, Hello World Web Page, Buttons, Functions, Variables, Identifiers, Assignment Statements and Objects, Document Object Model, Forms and How They're Processed: Client-Side Versus Server-Side, form Element, Controls, Text Control, Accessing a Form's Control Values, reset and focus Methods	6 hours

Course outcome (Course Skill Set)

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

CO1	Explain the historical context and justification for HTML over XHTML
CO2	Develop HTML5 documents and adding various semantic markup tags
CO3	Analyse various attributes, values and types of CSS
CO4	Implement core constructs and event handling mechanisms of JavaScript.

List of Programs – 22ESC145/245

Programming Assignments:

1. Create an XHTML page using tags to accomplish the following:
   (i) A paragraph containing text "All that glitters is not gold". Bold face and italicize this text
   (ii) Create equation:

$$x = 1/3(y_1^2 + z_1^2$$

   (iii) Put a background image to a page and demonstrate all attributes of background image

Create unordered list of 5 fruits and ordered list of 3 flowers

2. Create following table using XHTML tags. Properly align cells, give suitable cell padding and cell spacing, and

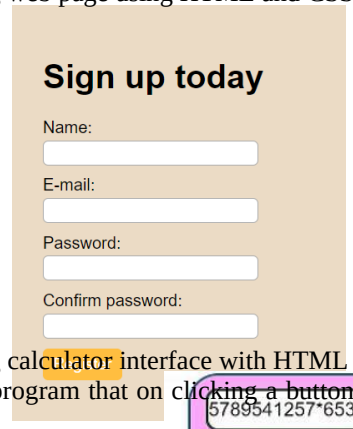
apply background color, bold and emphasis necessary

Department	**Sem1**	*SubjectA*
		SubjectB
		SubjectC
	Sem2	*SubjectE*
		SubjectF
		SubjectG
	Sem3	*SubjectH*
		SubjectI
		SubjectJ

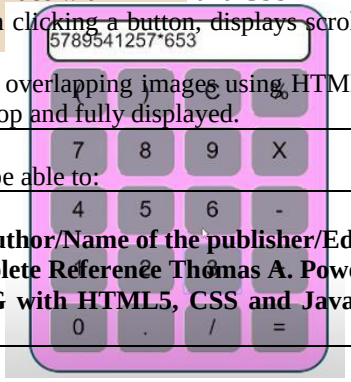
3. Use HTML5 for performing following tasks:
   (i) Draw a square using HTML5 SVG , fill the square with green color and make 6px brown stroke width
   (ii) Write the following mathematical expression by using HTML5 MathML. $d=x^2-y^2$
   (iii) Redirecting current page to another page after 5 seconds using HTML5 meta tag
4. Demonstrate the following HTML5 Semantic tags- <article>, <aside>, <details>, <figcaption>, <figure>, <footer>, <header>, <main>, <mark>, <section> for a webpage that gives information about travel experience.
5. Create a class called **income**, and make it a background color of #0ff. Create a class called **expenses**, and make it a background color of #f0f. Create a class called **profit**, and make it a background color of #f00.
   Throughout the document, any text that mentions income, expenses, or profit, attach the appropriate class to that piece of text. Further create following line of text in the same document:
   ~~The current price is 50₹~~ and new price is 40₹
6. Change the tag **li** to have the following properties:
   - A display status of inline
   - A medium, double-lined, black border
   - No list style type

   Add the following properties to the style for **li**:
   - Margin of 5px
   - Padding of 10px to the top, 20px to the right, 10px to the bottom, and 20px to the left

   Also demonstrate list style type with user defined image logos
7. Create following web page using HTML and CSS with tabular layout



8. Create following calculator interface with HTML and CSS



Write a Java Script program that on clicking a button, displays scrolling text which moves from left to right with a small delay

9. Create a webpage containing 3 overlapping images using HTML, CSS and JS. Further when the mouse is over any image, it should be on the top and fully displayed.

Course outcome (Course Skill Set)

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

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

TextBook-1: HTML & CSS: The Complete Reference Thomas A. Powell, , Fifth Edition, Tata McGraw Hill,

TextBook-2: WEB PROGRAMMING with HTML5, CSS and JavaScript, John Dean, Jones & Bartlett Learning, First Edition

Course Title:	Introduction to Python Programming		
Course Code:	22PLC15B/25B	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	Hours
Module-I **Python Basics**: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program, **Flow control:** Boolean Values, Comparison Operators, Boolean Operators,Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules,Ending a Program Early with sys.exit(), **Functions:** def Statements with Parameters, Return Values and return Statements,The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number	**6 hours**
Module-II **Lists:** The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References, **Dictionaries and Structuring Data:** The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things,	6 hours
Module-III **Manipulating Strings:** Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup **Reading and Writing Files:** Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module,Saving Variables with the print.format() Function, Project: Generating Random Quiz Files, Project: Multiclipboard,	6 hours
Module -IV **Organizing Files:** The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File, **Debugging:** Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE‟s Debugger.	6 hours
Module-V **Classes and objects:** Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying, **Classes and functions:** Time, Pure functions, Modifiers, Prototyping versus planning, **Classes and methods:** Object-oriented features, Printing objects, Another example, A more complicated example, Theinit method, The_str_ method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,	6 hours

Course outcome (Course Skill Set)

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

CO1	Demonstrate proficiency in handling loops and creation of functions.
CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
CO3	Develop programs for string processing and file organization
CO4	Develop programs for exception handling
CO4	Demonstrate the concepts of Object-Oriented Programming in Python.

List of Programs – 22PLC15B/25B

Programming Exercises:

1. Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages.
   b. Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.
2. Develop a program to generate Fibonacci sequence of length (N). Read N from the console.
   b. Write a function to calculate factorial of a number. Develop a program to compute binomial coefficient (Given N and R).
3. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.
4. Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.

5. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display dictionary slice of first 10 items

6. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip(), len(), list methods sort(), append(), and file methods open(), readlines(), and write()].

7. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods.

8. Write a function named DivExp which takes TWO parameters a, b and returns a value c (c=a/b). Write suitable assertion for a>0 in function DivExp and raise an exception for when b=0. Develop a suitable program which reads two values from the console and calls a function DivExp.

9. Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N (N >=2) complex numbers and to compute the addition of N complex numbers.

10. Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use init () method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display the score card details.]

Course outcome (Course Skill Set)

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

CO1	Demonstrate proficiency in handling loops and creation of functions.
CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
CO3	Develop programs for string processing and file organization
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.

Suggested Learning Resources:

Text Books

1. Al Sweigart,**"Automate the Boring Stuff with Python",** 1st Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/)

(Chapters 1 to 18, except 12) for lambda functions use this link: https://www.learnbyexample.org/python-lambda-function/

2. Allen B. Downey, **"Think Python: How to Think Like a Computer Scientist",** 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at http://greenteapress.com/thinkpython2/thinkpython2.pdf

(Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

Course Title:	Basics of Java Programming		
Course Code:	**22PLC15C/22PLC25C**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	**Hours**
Module-I **An Overview of Java:** Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements, Using Blocks of Code, Lexical Issues, The Java Class Libraries, Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, A Closer Look at Literals, Variables, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays, A Few Words About Strings	**6 hours**
Module-II **Operators:** Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The ? Operator, Operator Precedence, Using Parentheses, Control Statements: Java‟s Selection Statements, Iteration Statements, Jump Statements.	6 hours
Module-III **Introducing Classes:** Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The finalize( ) Method, A Stack Class, A Closer Look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Recursion, Introducing Access Control, Understanding static, Introducing final, Arrays Revisited	6 hours
Module -IV **Inheritance:** Inheritance, Using super, Creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance, The Object Class.	6 hours
Module-V Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces, Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java‟s Built-in Exceptions, Creating Your Own Exception Subclasses, Chained Exceptions, Using Exceptions.	6 hours

Course outcome (Course Skill Set)

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

CO1	To illustrate basics of JAVA programming
CO2	To demonstrate working of operators in JAVA
CO3	To create classes and objects for applications
CO4	To develop simple programs based on polymorphism and inheritance
CO5	To describe the concepts of importing packages and exception handling mechanism

List of Programs – 22PLC15B/25B

Programming Assignments

1. Write a JAVA program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a, b, c and use the quadratic formula.
2. Write a JAVA program for multiplication of two arrays.
3. Demonstrate the following operations and sign extension with Java programs (i) << (ii) >> (iii) >>>
4. Write a JAVA program to sort list of elements in ascending and descending order
5. Create a JAVA class called Student with the following details as variables within it.

   USN
   NAME
   BRANCH
   PHONE

PERCENTAGE

Write a JAVA program to create n Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings.

6. Write a JAVA program demonstrating Method overloading and Constructor overloading.
7. Design a super class called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a JAVA program to read and display at least 3 staff objects of all three categories.
8. Demonstrate dynamic dispatch using abstract class in JAVA.
9. Create two packages P1 and P2. In package P1, create class A, class B inherited from A, class C . In package P2, create class D inherited from class A in package P1 and class E. Demonstrate working of access modifiers (private, public, protected, default) in all these classes using JAVA.
10. Write a JAVA program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero. Also demonstrate working of ArrayIndex Out OfBoundException.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Herbert Schildt, Java The Complete Reference, 7th Edition, Tata McGraw Hill, 2007.

Course Title:	Introduction to C++ Programming		
Course Code:	22PLC15D/22PLC25D	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

MODULES	Hours
Module-I Introduction to Object Oriented Programming: Computer programming background- C++ overview. First C++ Program -Basic C++ syntax, Object Oriented Programming: What is an object, Classes, methods and messages, abstraction and encapsulation, inheritance, abstract classes, polymorphism.	**6 hours**
Module-II Functions in C++: Tokens – Keywords – Identifiers and constants – Operators in C++ – Scope resolution operator – Expressions and their types – Special assignment expressions – Function prototyping – Call by reference – Return by reference – Inline functions -Default arguments – Function overloading.	6 hours
Module-III Inheritance & Polymorphism: Derived class Constructors, destructors-Types of Inheritance- Defining Derived classes, Single Inheritance, Multiple, Hierarchical Inheritance, Hybrid Inheritance.	6 hours
Module -IV I/O Streams: C++ Class Hierarchy- File Stream-Text File Handling- Binary File Handling during file operations.	6 hours
Module-V Exception Handling: Introduction to Exception - Benefits of Exception handling- Try and catch block Throw statement- Pre-defined exceptions in C++	6 hours

Course outcome (Course Skill Set)

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

CO1	Able to understand and design the solution to a problem using object-oriented programming concepts.
CO2	Able to reuse the code with extensible Class types, User-defined operators and function Overloading.
CO3	Achieve code reusability and extensibility by means of Inheritance and Polymorphism
CO4	Implement the features of C++ including file stream and file handling
CO5	Demonstrate exception handling in C++

List of Programs – 22PLC15D/22PLC25D

Programming Assignments:

1. Write a C++ program to sort the elements in ascending and descending order.
2. Write a C++ program to find the sum of all the natural numbers from 1 to n.
3. Write a C++ program to swap 2 values by writing a function that uses call by reference technique.
4. Write a C++ program to demonstrate function overloading for the following prototypes.

add(int a, int b)
add(double a, double b)

5. Create a class named Shape with a function that prints "This is a shape". Create another class named Polygon inheriting the Shape class with the same function that prints "Polygon is a shape". Create two other classes named Rectangle and Triangle having the same function which prints "Rectangle is a polygon" and "Triangle is a polygon" respectively. Again, make another class named Square having the same function which prints "Square is a rectangle".Now, try calling the function by the object of each of these classes.

6.Suppose we have three classes Vehicle, FourWheeler, and Car. The class Vehicle is the base class, the class FourWheeler is derived from it and the class Car is derived from the class FourWheeler. Class Vehicle has a method 'vehicle' that prints 'I am a vehicle', class FourWheeler has a method 'fourWheeler' that prints 'I have four wheels', and class Car has a method 'car' that prints 'I am a car'. So, as this is a multi-level inheritance; we can have access to all the other classes methods from the object of the class Car. We invoke all the methods from a Car object and print the corresponding outputs of the methods.

So, if we invoke the methods in this order, car(), fourWheeler(), and vehicle(), then the output will be

I am a car
I have four wheels I
am a vehicle

Write a C++ program to demonstrate multilevel inheritance using this.

7. Write a C++ program to create a text file, check file created or not, if created it will write some text into the file and then read the text from the file.

8.Write a C++ program to write and read time in/from binary file using fstream

9. Write a function which throws a division by zero exception and catch it in catch block. Write a C++ program to demonstrate usage of try, catch and throw to handle exception.

10. Write a C++ program function which handles array of bounds exception using C++.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Textbooks

1. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.

Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd , Fourth Edition 2010.

Course Title: **C and UNIX programming (Integerated)**			
Subject Code: **22PLC25E**	Credit:3	CIE:50	
Number of Lecture Hours/Week	**02**	SEE:50	
Total Number of Lecture Hours	30	SEE Hours: 03	
MODULES			**Hours**
Module-I Introduction to pointers: The & and * operator, Pointer expressions, Jargon of Pointers, passing addresses to functions, Functions returning pointers, problems. Pointers and arrays: Passing array elements to a function, Pointers and arrays, passing an entire array to a function, Pointers and 2-D arrays, pointer to an array, passing 2D array to a function. problems., File pointers, pointers to functions, argc and argv-Arguments to main( ), pointers and variable number of arguments.			**06 Hrs**
Module-II Array of pointers, Dynamic Memory allocation, problems, Pointers and Strings: pointers and strings, const qualifier**,** 2D array of characters, array of pointers to strings, Limitation of array of pointers to strings. Problems. Pointers and Structures: Array of structures, structure pointers, offsets of Structure Elements. problems.			**06 Hrs**
Module-III Architecture of Unix, Features of Unix, Unix Commands - PATH, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, ls-l, ls-d, file ownership, file permissions, chmod, Directory permissions, changing file ownership.			**06 Hrs**
Module-IV Process basics, ps, process creation and killing, at , batch and cron commands, File Systems and Inodes, Hard link, symbolic links and ln, The Directory, umask, find, Filters- cut, paste, sort, uniq, tr, grep. System administration, administrators privileges, maintaining security, user management, startup and shutdown, managing Disk space ,Device files, cpio, tar, partitions and file systems, standard file systems and types, creating partitions and file systems, mounting and unmounting file systems.			**06Hrs**
Module V Shell programming: shell's interpretive cycle, pattern matching, Escaping and Quoting, Redirection, pipes, tee, command substitution, shell variables. shell scripts-simple shell programs using read, if, test, case, expr, while ,for, set, shift.			**06 Hrs**
Text Books: 1. Understanding Pointers in C, Yashwant Kanetkar, 3rd Edition, BPB Publisher 2.Unix concepts and applications, Sumitabha Das, 4th edition, Mcgraw Hill Education			
Reference Books: 1. C Programming – A Modern Approach, K. N. King, 2nd Edition, Mcgraw Hill Education nix and Shell programming, Dehrouza A Forouzan, Richard F Gilberg, Cengage Learning India 1st Edition			
CO1 Apply pointers in expressions, functions and arrays.			

CO2 Illustrate dynamic memory allocation, array of pointers , pointers to strings and structures.	
CO3 Demonstrate architecture of unix, unix commands related to files and directories	
CO4 Demonstrate lifecycle of Process, system administration and related commands.	
CO5 Develop simple shell scripts and demonstrate pattern matching.	
List of Programmes 1. Write a C program to demonstrate declaration and initialization of pointers. 2. Write a c program to perform pointers arithmetic. i.e. pointer addition ,subtraction, multiplication, division, auto increment and decrement. 3. WAP to swap two numbers using pointers. 4. WAP to read values in 1D-array: i) Pass entire array 1D to a function and display the same. ii) Return 1D-array from a function. 5. WAP to read values in 2D-array, Pass entire 2D-array to a function and display the same. 6. WAP to demonstrate pointers to an array. 7. WAP to read a string from the keyboard, pass entire string to a function and display the same. 8. WAP to demonstrate dynamic memory allocation of variables, arrays and structures 9. WAP to create structure, read structure elements, pass entire structure to a function and return the structure from function. 10. WAP to demonstrate pointers to structures. 11. WAP to demonstrate pointers to functions. 12. Display date and time in the format dd-mm-yy / hh:mm:ss? 13. Demonstrate the working of the following command. i) mkdir ii) cat iii) cp iv) rm v) mv. 14. Demonstrate the working of tee, pipe and command substitution. 15. Demonstrate the working of at and batch commands. 16. Demonstrate the working of cut, sort, paste on file. 17. Demonstrate the working of grep to locate the pattern in a file. 18. Write a shell script that accepts two directory names bar1 and bar2 and delete the files from bar2 that are identical in bar1. 19. Demonstrate cpio to backup and restore files. 20. Write a script to take two number as arguments and output their sum using i) bc ii) expr. 21. Write a shell script to read n numbers and find sum of even and odd numbers and display them separately. 22. Demonstrate embedding shell script in C Programming.	