



Hyderabad Karnataka Education Society's

POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING

Aiwan-E-Shahi Area, Kalaburagi-585102, Karnataka
(An Autonomous Institution Affiliated to VTU, Belagavi.)

Grant-in- Aid Institution
(Government of Karnataka) Accredited by NBA, New Delhi.
Approved by AICTE, New Delhi.

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SCHEME & SYLLABUS (1ST YEAR)

BACHELOR DEGREE IN ENGINEERING

CIVIL ENGINEERING STREAM

(With effect from the Academic Year 2022-23)

Out Come Based Education With
Choice Based Credit System

Scheme of Teaching and Syllabus
(With Effect From the Academic Year 2022-23)

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PREFACE

Poojya Doddappa Appa College of Engineering, Kalaburagi is the first institution established by the society in 1958. The college has celebrated its golden jubilee year, setting new standards in the field of education and achieving greater heights.

The college started with 50% central assistance and 50% state assistance, with a desire to impart quality technical education to this part of Karnataka State. The initial intake was 120 with degrees offered in three branches of engineering viz, Civil, Mechanical and Electrical Engineering. Now, it houses 12 undergraduate courses, 10 post Graduate courses and 13 recognized research centres, offering Ph.D. programs. All the courses are affiliated to Visveswaraya Technological University, Belagavi.

At present the total intake at UG level is 930 and PG level 184. The college receives grant in aid funds from state government. A number of projects have been approved by MHRD/AICTE, Govt. of India for Research and Modernization of laboratories. The Karnataka State Council for Science and Technology, Govt. of Karnataka is providing financial assistance regularly for the student's projects.

The National Board of Accreditation, New Delhi, has accredited the College twice once in the year 2004 with 09 UG programs out of which 08 programs were accredited for three years and 01 course was accredited for five years. At present the college is reaccredited by National Board of Accreditation for 05 UG programs.

Recognizing the excellent facilities, faculty, progressive outlook, high academic standards and record performance, the VTU Belagavi reposed abundant confidence in the capabilities of the College and conferred Autonomous Status from the academic year 2007-08, to update its own programme and curriculum, to devise and conduct examinations, and to evaluate student's performance based on a system of continuous assessment. The academic programs are designed and updated by a Board of Studies at the department level and Academic Council at the college level. These statutory bodies are constituted as per the guidelines of the VTU Belagavi. A separate examination section headed by a Controller of Examinations conducts the examinations.

One of the unique features of our college is, it is the first college in Karnataka State to start the Electronics and Communication Engineering branch way back in the year 1967, to join NIT Surathkal and IISc, Bangalore. Also, it is the only college in the state and one among the three colleges across the country, offering a course in Ceramic and Cement Technology. This is the outcome of understanding by faculty and management about the basic need of this region, keeping in view of the available raw material and existing Cement Industries.

PDA College of Engineering is one among the top 25 Institutions at National Level and Top Two Institutions at State Level as per ATAL Ranking of Technical Institutions. The rank is awarded for Innovation activities, Publications of faculty and students, Patents, Start-ups, Incubation Centers, reserving the budget for innovation activities, and involvement of Faculty and Students in Innovative and Skill Enrichment Activities.

Vision of the Institution

To be an institute of excellence in technical education and research to serve the needs of the industry and society at local and global levels.

Mission of the Institution

- To provide a high-quality educational experience for students with values and ethics that enables them to become leaders in their chosen professions.
- To explore, create and develop innovations in engineering and science through research and development activities.
- To provide beneficial service to national and multinational industries and communities through educational, technical and professional activities.

A. Program Outcomes

Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

POOYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI
SCHEME OF TEACHING AND EXAMINATION 2022
OUTCOME-BASED EDUCATION(OBE) AND CHOICE BASED CREDIT SYSTEM (CBCS)
(WITH EFFECT FROM THE ACADEMIC YEAR 2022-23)

I Semester CIVIL ENGINEERING														Chemistry Group				
Sl.No.	Course Course Code		Course Title	Teaching Dept. / PSB	Teaching Hours/Week					Examination								
					Theory	Tutorial	Practical/ Drawing	SDA		Duration in Hours	CIE MARKS	SEE MARKS	TOTAL MARKS	Credits				
								L	T						P	S		
1.	*ASC(IC)	22MATC11	Mathematics for Civil Engg. Stream-I	Maths	3	0	2	0	0	03	50	50	100	04				
2.	#ASC(IC)	22CHEC12	Chemistry for Civil Engg. Stream	Chemistry	3	0	2	0	0	03	50	50	100	04				
3.	ESC	22CED13	Computer Aided Engineering Drawing	Civil/Mech Dept.	2	0	2	0	0	03	50	50	100	03				
4.	ESC-I(IC)	22ESC145	Introduction to C Programming	Respective Engg. Dept.	2	0	2	0	0	03	50	50	100	03				
5.	ETC	22ETC15X	Emerging Technology Courses	Any Engg. Dept.	3	0	0	0	0	03	50	50	100	03				
6.	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	0	1.5	50	50	100	01				
7.	HSMS	22ICO17	Indian Constitution	Humanities	1	0	0	0	0	1.0	50	50	100	01				
8.	HSMS	22SFH18	Scientific Foundation of Health	Any Department	1	0	0	0	0	1.5	50	50	100	01				
				TOTAL							400	400	800	20				

SDA-Skill Development Activities, **TD/PSB**- Teaching Department / Paper Setting Board, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **ETC**- Emerging Technology Course, **AEC**- Ability Enhancement Course, **HSMS**-Humanity and Social Science and management Course, **SDC**- Skill Development Course, **CIE**-Continuous Internal Evaluation, **SEE**- Semester End Examination, **IC** – Integrated Course (Theory Course Integrated with Practical Course)

All 01 Credit- courses shall have the SEE of 01 hour 30 Minutes duration and the pattern of the question paper shall be MCQ

***-22MAT521** Shall have the 03 hours of theory examination(SEE), however, practical sessions question shall be included in the theory question papers

#-22CHES22- SEE shall have the 03 hours of theory examination and 02-03 hours of practical examination

ESC or ETC of 03 credits Courses shall have only a theory component (L:T :P:S=3:0:0:0) or if the nature the of course required experimental learning syllabus shall be designed as an Integrated course (L:T:P:S= 2:0:2:0),

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 (WITH EFFECT FROM THE ACADEMIC YEAR 2022-23)

II Semester CIVIL ENGINEERING											Physics Group				
Sl.No.	Course Course Code		Course Title	Teaching Dept. / PSB	Teaching Hours/Week					Examination					
					Theory	Tutorial	Practical/ Drawing	SDA	Duration in Hours	CIE MARKS	SEE MARKS	TOTAL MARKS	Credits		
														L	T
1.	*ASC(IC)	22MATC21	Mathematics for Civil Engg. Stream-II	Maths	3	0	2	0	0	03	50	50	100	04	
2.	#ASC(IC)	22PHYC22	Physics for Civil Engg. Stream	Physics	3	0	2	0	0	03	50	50	100	04	
3.	ESC	22CIV23	Engineering Mechanics	Civil Engg. Dept.	3	0	0	0	0	03	50	50	100	03	
4.	ESC-II	22ESC242	Introduction to Electrical Engg.	Respective Engg. Dept.	2	0	2	0	0	03	50	50	100	03	
5.	PLC (IC)	22PLC25X	Progrmming Language Courses	Any Engg. Dept.	2	0	2	0	0	03	50	50	100	03	
6.	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	0	1.5	50	50	100	01	
7.	HSMS	22KSK17/27 22KBK17/27	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	0	1.5	50	50	100	01	
8.	AEC/SDC	22IDT28	Innovation and Design Thinking	Any Department	1	0	0	0	0	1.5	50	50	100	01	
				TOTAL							400	400	800	20	

SDA-Skill Development Activities, **TD/PSB**- Teaching Department / Paper Setting Board, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **ETC**- Emerging Technology Course, **AEC**- Ability Enhancement Course, **HSMS**-Humanity and Social Science and management Course, **SDC**- Skill Development Course, **CIE**-Continuous Internal Evaluation, **SEE**- Semester End Examination, **IC** – Integrated Course (Theory Course Integrated with Practical Course)

All 01 Credit- courses shall have the SEE of 01 hour 30 Minutes duration and the pattern of the question paper shall be MCQ

***-22MAT21** Shall have the 03 hours of theory examination(SEE), however, practical sessions question shall be included in the theory question papers

#-22CHES22- SEE shall have the 03 hours of theory examination and 02-03 hours of practical examination

ESC or ETC of 03 credits Courses shall have only a theory component (L:T:P:S=3:0:0:0) or if the nature the of course required experimental learning syllabus shall be designed as an Integrated course (L:T:P:S= 2:0:2:0),

ESC-I - Engineering Science Courses - I				
Code	Title	L	T	P
22ESC141	Introduction to Civil Engineering	3	0	0
22ESC142	Introduction to Electrical Engineering	3	0	0
22ESC143	Introduction to Electronics Engineering	3	0	0
22ESC144	Introduction to Mechanical Engineering	3	0	0
22ESC145	Introduction to C Programming	2	0	2

ETC-I - Emerging Technology Courses - I				
Code	Title	L	T	P
22ETC15A	Green Buildings	3	0	0
22ETC15B	Introduction to Solar PV Systems	3	0	0
22ETC15C	Renewable Energy Sources	3	0	0
22ETC15D	Introduction to Internet of Things (IoT)	3	0	0
22ETC15E	Introduction to Cyber Security	3	0	0

PLC-I - Programming Language Courses - I				
Code	Title	L	T	P
22PLC15A	Introduction to Web Programming	2	0	2
22PLC15B	Introduction to Python Programming	2	0	2
22PLC15C	Introduction to C++ Programming	2	0	2
22PLC15D	C and UNIX Programming	2	0	2
22PLC15E	Basics of JAVA Programming	2	0	2

The course 22ESC145/245, Introduction to C Programming and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT

ESC-II - Engineering Science Courses - II				
Code	Title	L	T	P
22ESC241	Introduction to Civil Engineering	3	0	0
22ESC242	Introduction to Electrical Engineering	3	0	0
22ESC243	Introduction to Electronics Engineering	3	0	0
22ESC244	Introduction to Mechanical Engineering	3	0	0
22ESC245	Introduction to C Programming	2	0	2

ETC-II - Emerging Technology Courses - II				
Code	Title	L	T	P
22ETC25A	Green Buildings	3	0	0
22ETC25B	Introduction to Solar PV Systems	3	0	0
22ETC25C	Renewable Energy Sources	3	0	0
22ETC25D	Introduction to Internet of Things (IoT)	3	0	0
22ETC25E	Introduction to Cyber Security	3	0	0

PLC-II - Programming Language Courses - II				
Code	Title	L	T	P
22PLC25A	Introduction to Web Programming	2	0	2
22PLC25B	Introduction to Python Programming	2	0	2
22PLC25C	Introduction to C++ Programming	2	0	2
22PLC25D	C and UNIX Programming	2	0	2
22PLC25E	Basics of JAVA Programming	2	0	2

The course 22ESC145/245, Introduction to C Programming and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT

MATHEMATICS FOR CIVIL STREAM - I [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		
Lecture Hours/Week (L-T-P)	3-0-2	Total Marks	100
Total Hours	40 Hours Theory+12 Lab Hours	SEE Hours	03
Course Objectives: Familiarize the importance of calculus associated with one variable and two variables, the importance of Integral calculus for civil engineering. Analyze Civil engineering problems applying Ordinary Differential Equations. Develop the knowledge of Linear Algebra refereeing to matrices.			
MODULES			Hours
Module-1 Calculus 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.			08 Hours
Module-2 Series Expansion and Multivariable Calculus 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			08 Hours
Module-3 Ordinary Differential Equations (ODEs) of first order 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.			08 Hours

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.		
Module-4 Integral Calculus 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.		08 Hours
Module-5 Linear Algebra 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.		08 Hours
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		

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.

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 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

CHEMISTRY FOR CIVIL ENGINEERING STREAM

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)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 Hours Theory + 12 Lab Hours	Credits	04

Pre-requisite

Course Objectives

- To enable students to acquire knowledge on principles of chemistry for engineering applications.
- To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.
- To provide students with a solid foundation in analytical reasoning required to solve societal problems.

Module-1: Structural Materials

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).

**08
Hours**

Module-2: Energy Conversion and Storage, Corrosion

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.

**08
Hours**

<p style="text-align: center;">Module-3: Water Technology and Nanotechnology</p> <p>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.</p> <p>Nanotechnology: Introduction, properties and engineering application of carbon nanotubes, graphene and nanomaterials for water treatment(metal oxide)</p> <p>Self-learning: Introduction, classification, properties and application of silicon carbide.</p>	08 Hours
<p style="text-align: center;">Module-4:Polymer and Composites</p> <p>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.</p> <p>Conducting polymers – synthesis and conducting mechanism of Polyacetylene</p> <p>Fibers: Introduction, synthesis, properties and industrial applications of Kevlar and Polyester.</p> <p>Plastics: Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon.</p> <p>Adhesives: Introduction, synthesis, properties and application of epoxy resin.</p> <p>Polymer Composite: Introduction, properties and applications of fibre reinforced polymer composites.</p> <p>Self-learning: Biopolymer: Introduction, structural properties, and applications of cellulose and lignin, synthesis of polylactic acid and their application.</p>	08 Hours
<p style="text-align: center;">Module-5:Phase Rule and Analytical Techniques</p> <p>Phase rule: Introduction, Definition of terms: phase, components, degree of freedom, phase rule equation. Phase diagram: Two component-lead-silver system.</p> <p>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 determination of pH of beverages.</p> <p>Self-learning: Determination of viscosity of biofuel and its correlation with temperature.</p>	08 Hours

PRACTICAL MODULE

A – DEMONSTRATION (ANY TWO) OFFLINE/VIRTUAL:

- A1. SYNTHESIS OF POLYURETHANE
A2. QUANTITATIVE ESTIMATION OF ALUMINIUM BY
PRECIPITATION METHOD A3. 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 METHOD
B5. 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 cement D2. Electroplating of desired
metal on substrate
D3. Estimation of manganese dioxide in pyrolusite
D4. Analysis of cement for its components

Course outcome (Course Skill Set)

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

CO 1	Identify the terms and processes involved in scientific and engineering applications
CO 2	Explain the phenomena of chemistry to describe the methods of engineering processes
CO 3	Solve for the problems in chemistry that are pertinent in engineering applications
CO 4	Apply the basic concepts of chemistry to explain the chemical properties and processes
CO 5	Analyze properties and processes associated with chemical substances in multidisciplinary situations

COMPUTER AIDED ENGINEERING DRAWING			
Course Code	22 CED13/23	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	42 hours theory	Credits	03
Pre-requisite			
Course Objectives <p>Engineering drawing is an important tool for all Engineers and for many others professionals. It is the language of Engineers. Engineering Drawing communicates all needed information from the engineer who designed a part to the workers who will manufacture it. The aim of the subject is to equip students with the fundamentals of Computer Aided Engineering Drawing and to further the ability to communicate information by graphical means.</p>			
MODULES			Teaching Hours
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)			09 Hours
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).			09 Hours

<p style="text-align: center;">Module-3</p> <p>Isometric Projections: Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres. 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).</p>	08 Hours
<p style="text-align: center;">Module-4</p> <p>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.</p>	08 Hours
<p style="text-align: center;">Module-5</p> <p>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 to dimensions 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 any suitable software.</p>	08 Hours
<p>Text Book Text book:1) Engineering Drawing - N.D. Bhatt & V.M. Panchal, 48th edition, 2005- Charotar Publishing House, Gujarat. 2) "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Premkumar Fifth edition, New Age International Publishers</p> <p>Reference Book 1. 1) Computer Aided Engineering Drawing - S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006. 2) Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore. 3) Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production- Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005- Prentice-Hall of India Pvt. Ltd., New Delhi. 4) A Primer on Computer Aided Engineering Drawing-2006, Published by VTU, Belgaum.</p>	
<p>Course Outcomes At the end of the course the student will be able to:</p> <p>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.</p>	

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 Theory + 12 Hours Practical	Credits	03

Course Objectives

- Learn the concepts of C Language.
- Develop skills to solve computational problems

MODULES	Teaching Hours
<p style="text-align: center;">Module-I</p> <p>Algorithms, Flowcharts, Introduction to C: Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types.</p> <p>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.</p>	06 Hours
<p style="text-align: center;">Module-II</p> <p>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.</p> <p>Decision Making and Looping: While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.</p>	06 Hours
<p style="text-align: center;">Module-III</p> <p>Arrays: One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises.</p> <p>Strings: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.</p>	06 Hours
<p style="text-align: center;">Module -IV</p> <p>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.</p>	06 Hours

<p>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.</p> <p>Unions: Union, Size of Structures, bit fields , examples & exercises.</p>											
<p style="text-align: center;">Module-V</p> <p>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.</p> <p>File Management: Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.</p>	06 Hours										
<p>Text book:</p> <ol style="list-style-type: none"> 1. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– V Edition, 2016 <p>Reference books:</p> <ol style="list-style-type: none"> 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 Hall Publisher, Second Edition, 2004. 4. Behrouz A.Forouzan and Richard F.Gilberg,"Computer Program: A structured programming Approach Using C.", Third edition, Thomson Learning, 2005. 											
<p>Course outcome (Course Skill Set) At the end of the course the student will be able to:</p> <table border="1" data-bbox="253 1163 1421 1530"> <tr> <td data-bbox="253 1163 358 1257">C01</td><td data-bbox="358 1163 1421 1257">Develop Algorithm and flowcharts and understand the different data types and Operators in C language</td></tr> <tr> <td data-bbox="253 1257 358 1352">C02</td><td data-bbox="358 1257 1421 1352">Identify and use proper decision /control constructs for solving different type of problems</td></tr> <tr> <td data-bbox="253 1352 358 1409">C03</td><td data-bbox="358 1352 1421 1409">Apply arrays and Strings functions to develop programs for a given problem.</td></tr> <tr> <td data-bbox="253 1409 358 1465">C04</td><td data-bbox="358 1409 1421 1465">Demonstrate the use of structures and apply modular programming concepts</td></tr> <tr> <td data-bbox="253 1465 358 1530">C05</td><td data-bbox="358 1465 1421 1530">Develop C program for real world problems using pointers and file operations.</td></tr> </table>		C01	Develop Algorithm and flowcharts and understand the different data types and Operators in C language	C02	Identify and use proper decision /control constructs for solving different type of problems	C03	Apply arrays and Strings functions to develop programs for a given problem.	C04	Demonstrate the use of structures and apply modular programming concepts	C05	Develop C program for real world problems using pointers and file operations.
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C05	Develop C program for real world problems using pointers and file operations.										

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 $E = mgh + \frac{1}{2}mv^2$.
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 your 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

Course Code	22ENG16	CIE Marks	50
Course Type (Theory/Practical/Integrated)	THEORY	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	1:0:0:0	Exam Hours	1:30Min.
Total Hours of Pedagogy	15 Hours Theory	Credits	01

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 learn sensible writing
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 employment communication.

MODULES	Teaching Hours
<p style="text-align: center;">Module-I</p> <p>Introduction to Communication English: Meaning, Definition, Purpose of Communication, Types of Communication, 7c's of communication, Barriers to Communication. Interpersonal Communication Skills – Teamwork – Definition, Advantage and Disadvantages of utilizing the team work, Stages of the development of a team, Characteristic of Successful teams, challenges in team working,</p>	03 Hours
<p style="text-align: center;">Module-II</p> <p>Nature and Style of sensible writing: Writing - Purpose of Writing, Clarity in Writing, Principle of Effective Writing. Sensible writing – Types of writing styles, Writing Introduction and Conclusion.</p>	03 Hours
<p style="text-align: center;">Module-III</p> <p>Basic English Communicative Grammar and Vocabulary PART - I: Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes. Introduction to Vocabulary - Definition and Importance of vocabulary, All Types of Vocabulary, ways to improve vocabulary – Exercises on it</p>	03 Hours
<p style="text-align: center;">Module-IV</p> <p>Basic English Communicative Grammar and Vocabulary PART - II: Words formation - Prefixes and Suffixes -- Exercises, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Homonyms, Homographs, and Homophones -- Exercises, Tense and Types of tenses,</p>	03 Hours

MODULES		Teaching Hours										
<p align="center">Module-V</p> <p>Communication Skills for Employment: What is a presentation – Essential Element of Presentation, Designing and delivering Presentation/Public Speaking, Effective power point presentation, Communication through telephonic, videoconference & Skype. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence.</p>		03 Hours										
<p>Text Books:</p> <p>1. Communication Skills by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.</p> <p>2. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.</p> <p>3. Scotofer, contemporary business communication, Biztant ra</p> <p>4. Chaturvedi P D & Mukesh chaturvedi - Business communication: Concepts, cases & applications- 2/e, pearson education.</p> <p>5. Essential of Business communication – Rajendra Pal and J.S Korlhall – Sultan Chand & Sons, New Delhi.</p> <p>Reference Books:</p> <p>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.</p> <p>2. English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.</p> <p>3. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978- 93-86668-45-5), 2019.</p> <p>4. A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press – 2020.</p> <p>5. Practical English Usage by Michael Swan, Oxford University Press – 2016.</p> <p>6. Business Communication – K.K. Sinha – Galgotia Publishing Company, New Delhi.</p>												
<p>Course outcome (Course Skill Set)</p> <p>At the end of the course the student will be able to:</p> <table><tr><td>CO 1</td><td>Understand and apply the Fundamentals of Communication Skills in their communication skills.</td></tr><tr><td>CO 2</td><td>Learn sensible writing</td></tr><tr><td>CO 3</td><td>To impart basic English grammar and essentials of language skills as per present requirement.</td></tr><tr><td>CO 4</td><td>Understand and use all types of English vocabulary and language proficiency</td></tr><tr><td>CO 5</td><td>Adopt the Techniques of Information Transfer through presentation.</td></tr></table>			CO 1	Understand and apply the Fundamentals of Communication Skills in their communication skills.	CO 2	Learn sensible writing	CO 3	To impart basic English grammar and essentials of language skills as per present requirement.	CO 4	Understand and use all types of English vocabulary and language proficiency	CO 5	Adopt the Techniques of Information Transfer through presentation.
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INDIAN CONSTITUTION			
Course Code	22ICO17/27	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	1:0:0:0	Exam Hours	1.0
Total Hours of Pedagogy	15 Hours Theory	Credits	01
Prerequisite: Nil			
Course Objectives : To enable the students to obtain the basic knowledge about Indian Constitution in the following topics:- <ul style="list-style-type: none"> ■ To know about the basic structure of Indian constitution ■ To know the Fundamental Rights (FR's) & Fundamental Duties (FD's) , And DPSP's of our constitution. ■ To know the State Executive ■ To know about our Union Government ■ To Learn emergency provisions and Elections process/system of India 			
MODULES		Teaching Hours	
Module-I		03 Hours	
Introduction to Indian constitution : The Constituent Assembly of India. Sources and Features of the Indian Constitution. Preamble to the Constitution of India.			
Module-II		03 Hours	
Fundamental rights & duties and Directive Principles of the State Policy Salient Features of Fundamental Rights and their classification. General exercise of Fundamental Rights and their limitations. Fundamental Duties. and Directive Principles of the State Policy			
Module-III		03 Hours	
The State Executive: The Governor- Appointment, Powers and Functions of the Governor. The Chief Minister - Appointment, Powers and Functions of CM. The State Council of Ministers and their Functions. The State legislature(MLA) and The State Council(MLC). The High Court of the State - Appointment and Qualifications of High Court Judges., its Powers and Jurisdiction			
Module-IV		03 Hours	
The Union Executive: The President of India - His Election, Powers and Functions. The Vice-President of India - His Election, qualifications, Powers and Functions. The Supreme Court of India - Appointment and Qualification of Supreme Court Judges and its Powers and Jurisdiction..The Parliament of India. The Prime Minister - His Appointment, Qualification ,Powers and Functions. Union cabinet – Its Functions			

MODULES	Teaching Hours										
<p style="text-align: center;">Module-V</p> <p>Emergency Provisions and Election Process : Different types of Emergencies under Article 352, 356 and 360 of the Constitution of India. The Election Commission of India- its Powers and Functions. The State Election Commission</p>	03 Hours										
<p>Text Books :</p> <ol style="list-style-type: none"> 1. An introduction to the constitution of India and Profession Ethics. By B. R. Venkatesh and Merunandan K. B. Publisher : Idea International Publication Bangalore. 2. The Constitution of India and Professional Ethics. By K. R. Phaneesh. Publisher : Sudha Publication Bangalore. 3. Professional Ethics. By S. Chand. Publisher : S. Chand & Company Ltd. Ram Nagar, New Delhi - 110055. <p>Reference Books :</p> <ol style="list-style-type: none"> 1. Constitution of India and Professional Ethics By : M Raja Ram. Publisher : New Age International(P) Limited, New Delhi. 2. The Constitutional law of India By : J.N.Pandhey . Publisher : Central Law agency , Allahabad. <p>https://legislative.gov.in/constitution-of-india https://www.constitutionofindia.net/</p> <p>Course outcome (Course Skill Set) At the end of the course the student will be able to:</p> <table border="1" data-bbox="256 1262 1393 1656"> <tr> <td data-bbox="256 1262 362 1354">CO 1</td><td data-bbox="362 1262 1393 1354">Analyse the basic structure of Indian Constitution - Constituent Assembly , Sources, features and preamble to the Constitution of India</td></tr> <tr> <td data-bbox="256 1354 362 1423">CO 2</td><td data-bbox="362 1354 1393 1423">Describe the Fundamental rights & duties and Directive Principles of the State Policy</td></tr> <tr> <td data-bbox="256 1423 362 1495">CO 3</td><td data-bbox="362 1423 1393 1495">Understand our State Executive</td></tr> <tr> <td data-bbox="256 1495 362 1564">CO 4</td><td data-bbox="362 1495 1393 1564">Understand our Union Executive</td></tr> <tr> <td data-bbox="256 1564 362 1656">CO 5</td><td data-bbox="362 1564 1393 1656">Explain the types of emergencies and election process in India</td></tr> </table>		CO 1	Analyse the basic structure of Indian Constitution - Constituent Assembly , Sources, features and preamble to the Constitution of India	CO 2	Describe the Fundamental rights & duties and Directive Principles of the State Policy	CO 3	Understand our State Executive	CO 4	Understand our Union Executive	CO 5	Explain the types of emergencies and election process in India
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SCIENTIFIC FOUNDATIONS OF HEALTH

Course Code	22SFH18/28	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	1:0:0:0	Exam Hours	
1:30Min			
Total Hours of Pedagogy	15 Hours Theory	Credits	01

Pre-requisite : NIL

Course Objectives : The course Scientific Foundations of Health (22SFH18/28) will enable the students:

1. To know about Health and wellness (and its Beliefs) & its balance for positive mindset.
2. To build the healthy lifestyles for good health for their better future.
3. To Create a Healthy and caring relationships to meet the requirements of good/social/positive life.
4. To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future
5. To Prevent and fight against harmful diseases for good health through positive mindset

MODULES	Teaching Hours
<p style="text-align: center;">Module-I</p> <p>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.</p>	03 Hours
<p style="text-align: center;">Module-II</p> <p>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 for health, Wellness and physical function, How to avoid exercise injuries.</p>	03 Hours
<p style="text-align: center;">Module-III</p> <p>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.</p>	03 Hours

<p style="text-align: center;">Module-IV</p> <p>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 addictive people and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.</p>	<p style="text-align: center;">03 Hours</p>										
<p style="text-align: center;">Module-V</p> <p>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.</p>	<p style="text-align: center;">03 Hours</p>										
<p>Text book:</p> <ol style="list-style-type: none"> 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. 											
<p>Reference books:</p> <ol style="list-style-type: none"> 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 & Wellness) - General Books published for university and colleges references by popular authors and published by the reputed publisher. 											
<p>Course outcome (Course Skill Set) At the end of the course the student will be able to:</p> <table border="1" data-bbox="251 1465 1416 1843"> <tr> <td data-bbox="251 1465 358 1556">C01</td><td data-bbox="358 1465 1416 1556">To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.</td></tr> <tr> <td data-bbox="251 1556 358 1619">C02</td><td data-bbox="358 1556 1416 1619">Develop the healthy lifestyles for good health for their better future.</td></tr> <tr> <td data-bbox="251 1619 358 1703">C03</td><td data-bbox="358 1619 1416 1703">Build a Healthy and caring relationships to meet the requirements of good/social/positive life</td></tr> <tr> <td data-bbox="251 1703 358 1787">C04</td><td data-bbox="358 1703 1416 1787">To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.</td></tr> <tr> <td data-bbox="251 1787 358 1843">C05</td><td data-bbox="358 1787 1416 1843">Prevent and fight against harmful diseases for good health through positive mindset.</td></tr> </table>		C01	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.	C02	Develop the healthy lifestyles for good health for their better future.	C03	Build a Healthy and caring relationships to meet the requirements of good/social/positive life	C04	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.	C05	Prevent and fight against harmful diseases for good health through positive mindset.
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GREEN BUILDING			
Course Code	22ETC15A/25A	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	42 Hours Theory	Credits	03
Pre-Requisite: NIL			
Course objectives: This course will enable students to: <ul style="list-style-type: none">■ Understand the Definition, Concept & Objectives of the terms cost effective construction and green building■ Apply cost effective techniques in construction■ Apply cost effective Technologies and Methods in Construction■ Understand the Problems due to Global Warming · State the Concept of Green Building · Understand Green Buildings			
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.			09 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.			09 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.			08 Hours
Module -IV Energy conservation, concepts of solar passive cooling and heating of building, low energy cooling, Case studies on residential and commercial buildings			08 Hours
Module-V Water conservation, Rain water harvesting: definition, types and advantages, concepts of green composite			08 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 Mösele 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 Home! 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 Outcomes

- CO1: To understand the Concepts, Benefits, and the materials for Green building.
- CO2: To know the energy efficiency, recycling of wastes for Green building.
- CO3: To understand the Thermal, Heat Transfer and ventilation of Buildings
- CO4: To acquire knowledge of energy conservation in buildings
- CO5: To understand the practices for water conservation.

INTRODUCTION TO SOLAR PV SYSTEMS			
Course Code	22ETC15B/25B	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	42 Hours Theory	Credits	03
<p>Prerequisite: Students should have the knowledge of</p> <ol style="list-style-type: none"> 1. Energy Fundamentals. 2. Renewable energy sources <p>Course objectives.</p> <ul style="list-style-type: none"> ■ Understanding the need of energy and basics of solar radiations. ■ Study different solar thermal energy applications. ■ Expose to PV Industry and different PV technologies. ■ Study Inverters and different components of PV system. ■ Study the installation of PV systems and O&M. 			
MODULES			Hours
<p align="center">Module-I</p> <p>Solar Resource and Radiation An introduction to Energy Sources: Energy consumption as a measure of Prosperity, world energy futures and energy sources and their availability. 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.</p>			09 Hours
<p align="center">Module - II</p> <p>Solar thermal energy The solar energy option – An overview of thermal applications: Devices for thermal collection and storage, thermal applications and some observations.</p>			09 Hours
<p align="center">Module-III</p> <p>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.</p>			08 Hours
<p align="center">Module -IV</p> <p>Inverters and Other System Components Inverters and Other System Components: Introduction, Inverters, Battery inverters, Grid-interactive inverters, Transformers, Mainstream inverter technologies,</p>			

MODULES	Hours										
<p>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.</p>	08 Hours										
<p style="text-align: center;">Module-V</p> <p>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/earthing, 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.</p>	08 Hours										
<p>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.</p> <p>Reference Books</p> <ol style="list-style-type: none"> 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 <p>Course outcomes: On completion of the course, the student will have the ability to</p> <table border="1" data-bbox="253 1640 1412 1908"> <tr> <td>C01</td><td>Understand the needs of energy and discuss the solar radiation.</td></tr> <tr> <td>C02</td><td>Appreciate the solar thermal energy applications.</td></tr> <tr> <td>C03</td><td>Discuss the PV technology and Industry.</td></tr> <tr> <td>C04</td><td>Identify the components of PV system and Inverters.</td></tr> <tr> <td>C05</td><td>Understand the installation of PV system and O&M of PV systems</td></tr> </table>		C01	Understand the needs of energy and discuss the solar radiation.	C02	Appreciate the solar thermal energy applications.	C03	Discuss the PV technology and Industry.	C04	Identify the components of PV system and Inverters.	C05	Understand the installation of PV system and O&M of PV systems
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C05	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	42 Hours Theory	Credits	03
<p>Prerequisite: Nil</p> <p>Course objectives:</p> <ul style="list-style-type: none"> ■ To understand energy scenario, energy sources and their utilization. ■ To explore society's present needs and future energy demands. ■ To Study the principles of renewable energy conversion systems. ■ To exposed to energy conservation methods. 			
MODULES			Hours
<p align="center">Module-I</p> <p>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</p>			09 Hours
<p align="center">Module - II</p> <p>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</p>			09 Hours
<p align="center">Module-III</p> <p>WIND ENERGY: Wind Data and Energy Estimation – Wind Energy Conversion Systems – Performance – Site Selection— Safety and Environmental Aspects.</p> <p>BIOMASS ENERGY: Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies-fixed dome and floating type; Urban waste to energy conversion. Biomass Applications.</p>			08 Hours
<p align="center">Module -IV</p> <p>Tidal Power: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, advantages and limitations.</p> <p>Ocean Thermal Energy Conversion: Principle of working, OTEC power stations in the world, advantages and disadvantage with OTEC.</p>			08 Hours
<p align="center">Module-V</p> <p>Green Energy: Introduction, Fuel cells: Classification of fuel cells – H₂; 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.</p>			08 Hours

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 Energy Resources, Shobh Nath Singh, Pearson, 2018

Course outcome (Course Skill Set)

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

C01	Describe the environmental aspects of renewable energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
C02	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.
C03	Understand the conversion principles of wind and tidal energy
C04	Understand the concept of biomass energy resources and green energy
C05	Acquire the basic knowledge of ocean thermal energy conversion and hydrogen energy.

INTRODUCTION TO INTERNET OF THINGS			
Course Code	22ETC15D/25D	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	42 Hours Theory	Credits	03
Prerequisite: NIL			
Course objectives: <ul style="list-style-type: none"> ■ Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics. ■ Understand the recent application domains of IoT in everyday life. ■ Gain insights about the current trends of Associated IOT technologies and IOT Analytics 			
MODULES			Hours
Module-I Basics of Networking: Introduction, Network Types, Layered network models Emergence of IoT: Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components Textbook 1: Chapter 1- 1.1 to 1.3 Chapter 4 – 4.1 to 4.4			09 Hours
Module - II IoT Sensing and Actuation: Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics. Textbook 1: Chapter 5 – 5.1 to 5.9			09 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			08 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			08 Hours

MODULES		Hours
Module-V IOT CASE STUDIES AND FUTURE TRENDS Vehicular IoT – Introduction Healthcare IoT – Introduction, Case Studies IoT Analytics Introduction Textbook 1: Chapter 13– 13.1; Chapter 14- 14.1-14.2; Chapter 17- 17.1		08 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 Madiseti 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:		
C01	Describe the evolution of IoT, IoT networking components, and addressing strategies in IoT.	
C02	Classify various sensing devices and actuator types.	
C03	Demonstrate the processing in IoT.	
C04	Explain Associated IOT Technologies	
C05	Illustrate architecture of IOT Applications	

INTRODUCTION TO CYBER SECURITY			
Course Code	22ETC15E/25E	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	42 Hours Theory	Credits	03
Course objectives <ul style="list-style-type: none"> ■ 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			Hours
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)			09 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)			09 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 Attacks, Attacks on Wireless networks. Textbook:1 Chapter 4 (4.1 to 4.9, 4.12)			08 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)			08 Hours
Module-V Understnading Computer Forensics: Introdcutio, 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)			08 Hours

Text book:1.

1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, 2011, First Edition (Reprinted 2018)

Reference books:

1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011) Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)

Course outcome (Course Skill Set)

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

C01	Explain the cybercrime terminologies
C02	Describe Cyber offenses and Botnets
C03	Illustrate Tools and Methods used on Cybercrime
C04	Explain Phishing and Identity Theft
C05	Justify the need of computer forensics

MATHEMATICS FOR CIVIL ENGINEERING STREAM - II

[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	40 hours Theory +12 Lab slots	Exam Hours	03

Prerequisite: Nil

Course objectives:

Familiarize Vector calculus essential for civil engineering.

Analyze Civil engineering problems by applying Partial Differential Equations.

Develop the knowledge of solving civil engineering problems numerically.

MODULES	Hours
<p align="center">Module-1 Vector Calculus</p> <p>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.</p>	08 Hours
<p align="center">Module-2 Ordinary Differential Equations of higher order</p> <p>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.</p>	08 Hours
<p align="center">Module-3 Partial Differential Equations (PDEs)</p> <p>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</p>	08 Hours

<p>with respect to one independent variable only. Solution of Lagrange's linear PDE. Derivation of one-dimensional heat equation and wave equation.</p> <p>Self-Study: Solution of one-dimensional heat equation and wave equation by the method of separation of variables.</p> <p>Applications: Design of structures (vibration of rod/membrane)</p>	
<p>Module-4 Numerical Methods -1</p> <p>Importance of numerical methods for discrete data in the field of EC & EE engineering applications.</p> <p>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.</p> <p>Self-Study: Bisection method, Lagrange's inverse Interpolation.</p> <p>Applications: Estimating the approximate roots, extremum values.</p>	08 Hours
<p>Module-5 Numerical Methods -2</p> <p>Numerical integration: Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof). Problems.</p> <p>Introduction to various numerical techniques for handling EC & EE applications.</p> <p>Numerical Solution of Ordinary Differential Equations (ODEs):</p> <p>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.</p> <p>Self-Study: Adam-Bashforth method.</p> <p>Applications: Estimating the approximate solutions of ODE for electric circuits.</p>	08 Hours
<p>List of Laboratory experiments (2 hours/week per batch/ batch strength 15)</p> <p>10 lab sessions + 1 repetition class + 1 Lab Assessment</p> <ol style="list-style-type: none"> 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 Lagrange's linear partial differential 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 <p>Suggested software's: Mathematica/MatLab/Python/Scilab</p>	

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.

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 outcome (Course Skill Set)

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

C01	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
C02	Analyze the solution of higher order ordinary differential equations.
C03	Demonstrate partial differential equations and their solutions for physical interpretations.
C04	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
C05	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab

PHYSICS FOR CIVIL ENGINEERING 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)	3:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 12 Hours Lab	Credits	04

Prerequisite:

Basics of Oscillations, Elasticity, Stress & Strain,

Basics of Sound, Waves & light properties, Properties of light. Oscillations.

Course objectives.

- To understand the types of oscillation, shock waves & its generation, and applications.
- To Study the elastic properties of materials and failures of engineering materials
- To Study the acoustics buildings and the essentials of radiometry and photometry.
- To understand the principles photonic devices and their application relevant to civil engineering.
- To understand the various natural disaster and safety

Modules	Teaching Hours
<p style="text-align: center;">Module-1</p> <p>Module -I: Oscillations and Shock waves: Oscillations: Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Springs: 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</p>	08 Hours
<p style="text-align: center;">Module-2</p> <p>Elasticity Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio, Relation between γ, 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</p>	08 Hours

<p style="text-align: center;">Module-3</p> <p>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.</p> <p>Radiometry and Photometry: Radiation Quantities, Spectral Quantities, Relation between luminance and Radiant quantities, Reflectance and Transmittance, Photometry (cosine law and inverse square law).</p> <p>Prerequisites: Basics of Sound, Waves & light properties. Self-learning: Introduction to acoustics.</p>	08 Hours
Module-4	
<p>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.</p> <p>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</p> <p>re requisite: Properties of light. Self-learning: Total Internal Reflection.</p>	08 Hours
<p style="text-align: center;">Module-5</p> <p>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.</p> <p>Pre requisite: Oscillations. Self-learning: Richter scale.</p>	08 Hours
<p>Course outcome (Course Skill Set) At the end of the course the student will be able to:</p> <p>CO1 Elucidate the concepts in oscillations, waves, elasticity and material failures</p> <p>CO2 Summarize concepts of acoustics in buildings and explain the concepts in radiation and photometry</p> <p>CO3 Discuss the principles photonic devices and their application relevant to civil engineering.</p> <p>CO4 Describe the various natural hazards and safety precautions.</p> <p>CO5 Practice working in groups to conduct experiments in physics and perform precise and honest measurements.</p>	

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 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. Fly wheel
18. Interference of air wedge

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

ENGINEERING MECHANICS

Course Code	22CIV13/23	CIE Marks	50
Credits	03	SEE Marks	50
Course Type	Theory		
Contact Hours/Week (L-T-P)	3-0-0-0	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory	Exam Hours	03

Prerequisite: Physics and Mathematics

Course Learning Objectives:

To enable the student to acquire the knowledge in the following topics

- 1) Understanding and solving the problems involving forces, loads and reactions, Moments and its applications of concurrent force system.
- 2) Solving the problems of couples and equilibrium of bodies.
- 3) To determine support reactions and friction of rigid bodies on horizontal and inclined planes.
- 4) To determine the center of gravity and moment of inertia of planar sections.
- 5) To study the concept of work, power & energy.

MODULES	Teaching Hours
Module-I Introduction to Engineering Mechanics, force Systems, Basic concepts, Particle equilibrium; Rigid Body equilibrium; System of Forces; Coplanar Concurrent Forces, Composition and resolution of force systems, Resultant force, Moment of Forces and its Application; law of transmissibility of forces, Application based numerical examples	09 Hours
Module-II Varignon's theorem of moments Couple system, equivalent force couple system, composition of coplanar non concurrent force system, Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and conditions of equilibrium law of superposition of forces. Application based Numerical examples	08 Hours
Module-III Types of supports, types of loads, concept of statically determinate and indeterminate beams, support reactions for statically determinate beams. Friction, Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Impending motion on horizontal and inclined planes, wedge friction, ladder friction. Application based Numerical examples	08 Hours

<p style="text-align: center;">Module-IV</p> <p>Centroid of plane figures, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; locating the centroid of triangle, semicircle, quadrant of a circle and sector of a circle, centroid of the simple built sections & composite sections, Moment of inertia concept, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections. Numerical examples</p>	<p style="text-align: center;">09 Hours</p>										
<p style="text-align: center;">Module-V</p> <p>Work, Power & Energy, Introduction, Work of a force, Energy of a particle, principle of work & energy for a system of particles, Potential energy and conservative forces, principles of conservation of energy, Power. Application based Numerical example</p>	<p style="text-align: center;">08 Hours</p>										
<p>Text book:</p> <p>Text Books:</p> <ol style="list-style-type: none"> 1. S.S.Bhavikatti,"Elementsofcivilengineering",Vikaspublishinghouse Pvt. Ltd., New Delhi. 2.Jagadeesh T.R. and Jayaram, "Elements of civil engineering", Sapna Book House,Bangalore. 3. A.K. Tayal, "Engineering mechanics (Statics & Dynamics)", Ninth edition, Umesh publications, New Delhi. <p>Reference books:</p> <ol style="list-style-type: none"> 1. Timoshenko and Young,Engineering Mechanics",McGraw Book Company, New Delhi. 2. Ferdinand P. Beer and E. Russel Johnston Jr., "Mechanics for Engineers: Statics" McGraw Book Company, NewDelhi. 3. K.L. Kumar, "Engineering Mechanics", Tata-McGraw-Hill Publishing company, New Delhi 											
<p>Course outcome (Course Skill Set) At the end of the course the student will be able to:</p> <table border="1" data-bbox="253 1455 1421 1864"> <tr> <td data-bbox="253 1455 358 1518">C01</td><td data-bbox="358 1455 1421 1518">Determine the resultant of coplanar concurrent force system</td></tr> <tr> <td data-bbox="253 1518 358 1623">C02</td><td data-bbox="358 1518 1421 1623">Determine the resultant of non-concurrent force system and analyze the equilibrium of forces</td></tr> <tr> <td data-bbox="253 1623 358 1728">C03</td><td data-bbox="358 1623 1421 1728">Determine support reactions and apply of laws of friction for solving engineering problems</td></tr> <tr> <td data-bbox="253 1728 358 1791">C04</td><td data-bbox="358 1728 1421 1791">Determine the center of gravity and moment of inertia of plane figures</td></tr> <tr> <td data-bbox="253 1791 358 1864">C05</td><td data-bbox="358 1791 1421 1864">Solve the numerical on work, power and energy</td></tr> </table>		C01	Determine the resultant of coplanar concurrent force system	C02	Determine the resultant of non-concurrent force system and analyze the equilibrium of forces	C03	Determine support reactions and apply of laws of friction for solving engineering problems	C04	Determine the center of gravity and moment of inertia of plane figures	C05	Solve the numerical on work, power and energy
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INTRODUCTION TO ELECTRICAL ENGINEERING

Course Code	22ESC142/242	CIE Marks	50
Credits	03	SEE Marks	50
Course Type	Theory		
Contact Hours/Week (L-T-P)	3-0-0-0	Total Marks	100
Contact Hours of Pedagogy	42 hours Theory	Exam Hours	03

Prerequisite: Students should have the knowledge of

1. Ohms Law, Kirchhoff's Current and Voltage Law.
2. Fundamentals of AC and DC Circuits.
3. Basics of Magnetism.

Course Objectives

1. Understanding the concept and analysis of Single phase and Three phase AC circuits.
2. Study of construction and performance analysis of single phase transformer.
3. Study of construction and working principle of DC machines
4. Study of construction and working principle of Three phase AC Machines.
5. Study of Power Generation stations, Tariff, measuring instruments and electric safety measures.

MODULES	Hours
<p style="text-align: center;">Module-I</p> <p>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.</p>	8 hrs
<p style="text-align: center;">Module-II</p> <p>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).</p>	8 hrs
<p style="text-align: center;">Module-III</p> <p>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.</p>	8 hrs

<p align="center">Module-IV</p> <p>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</p> <p>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.</p>		8 hrs														
<p align="center">Module-V</p> <p>Domestic Wiring: Requirements, Types of wiring: casing, capping. Two way and three way control of load.</p> <p>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.</p> <p>Equipment Safety measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.</p> <p>Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.</p>		8 hrs														
<p>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.</p>																
<p>Reference books:</p> <ol style="list-style-type: none"> 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. 																
<p>Course outcomes: On completion of the course, the student will have the ability to:</p> <table border="1"> <thead> <tr> <th>Course Code</th><th>CO's</th><th>Course Outcome (CO)</th></tr> </thead> <tbody> <tr> <td rowspan="5">22ESC142/242</td><td>CO1</td><td>Understand the concepts of various energy sources and Electric circuits.</td></tr> <tr> <td>CO2</td><td>Apply the basic Electrical laws to solve circuits.</td></tr> <tr> <td>CO3</td><td>Discuss the construction and operation of various Electrical Machines.</td></tr> <tr> <td>CO4</td><td>Identify suitable Electrical machine for practical implementation.</td></tr> <tr> <td>CO5</td><td>Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.</td></tr> </tbody> </table>			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.
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PROFESSIONAL WRITING SKILLS IN ENGLISH			
Course Code	22 PWS 26	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	1:0:0:0	Exam Hours	1:30Min
Total Hours of Pedagogy	15 Hours Theory	Credits	01
<p>Prerequisite: NIL</p> <p>Course objectives:</p> <p>The course Communicative English (22PWS26) will enable the students</p> <ol style="list-style-type: none"> 1. To Identify the Common Errors in Writing and Speaking of English. 2. To Learn effective writing. 3. To read Technical proposals properly and make them to write good technical reports. 4. To Acquire Employment communication skills. 5. To Acquire communication skills at Workplace 			
MODULES			Teaching Hours
<p align="center">Module-I</p> <p>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.</p>			03 Hours
<p align="center">Module-II</p> <p>Effective Writing: Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Better writing using personal Experiences – Describing a person, situation, memorable events etc.... Sentence arrangements and Corrections activities. Misplaced modifiers, Collocations, Word Order.</p>			03 Hours
<p align="center">Module-III</p> <p>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 and basic principles of technical writing. Grammar – Cloze Test and Theme Detection Exercises</p>			03 Hours
<p align="center">Module-IV</p> <p>Professional Communication for Employment: Writing different types of letters – writing for employment, joining letter, complaints & follows up, Enquiries, representation etc. Writing Curriculum Vitae(CV), Official Communication – E-mail & Social Media</p>			03 Hours

MODULES	Teaching Hours										
<p style="text-align: center;">Module-V</p> <p>Professional Communication at Workplace:</p> <p>Group Discussion – Do and Don't in Group discussion. Debate – Do and Don't in Debate. Group Communication- Meetings, Notice, Planning Meetings, objectives, leading meetings, Minutes of meeting, press conference. Interview – candidates preparation, grooming and Just A Minute (JAM). Speaking for better communication – Speaking about yourself.</p>	03 Hours										
<p>Text Books:</p> <ol style="list-style-type: none"> 1."Professional Writing Skills in English" published by Fillip Learning – Education (ILS), Bangalore – 2022. 2) 2."Functional English" (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019]. 3.Murphy – Effective Business Communication – Mc Graw Hill. 4.Nageshwar Rao and Rajendra Das – Business Skills – HPH. 5.Advance Business Communcation – Penrose, Rasberry, Myers, 5/e, cengage learning 2004. 6.Prasad P. Communication Skills, S.K. Kataria & Sons. <p>Reference Books:</p> <ol style="list-style-type: none"> 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 6.Mc Grath – Basic Mangerial Skills – New Delhi – Prentic Hall India learning pvt ltd. 7.Business Communcation – K.K. Sinha – Galgotio Publishing Company, New Delhi. 8.Sen, leena Communication Skills, Prentice Hall of India, New Delhi. 											
<p>Course outcome (Course Skill Set)</p> <p>At the end of the course the student will be able to:</p> <table border="1" data-bbox="253 1608 1409 1915"> <tr> <td data-bbox="253 1608 347 1659">CO1</td><td data-bbox="347 1608 1409 1659">To understand and identify the Common Errors in Writing and Speaking.</td></tr> <tr> <td data-bbox="253 1659 347 1709">CO2</td><td data-bbox="347 1659 1409 1709">To learn effective writing.</td></tr> <tr> <td data-bbox="253 1709 347 1759">CO3</td><td data-bbox="347 1709 1409 1759">To read Technical proposals properly and make them to Write good technical reports.</td></tr> <tr> <td data-bbox="253 1759 347 1810">CO4</td><td data-bbox="347 1759 1409 1810">Acquire Employment and Workplace communication skills.</td></tr> <tr> <td data-bbox="253 1810 347 1915">CO5</td><td data-bbox="347 1810 1409 1915">Acquire communication skills at workplace</td></tr> </table>		CO1	To understand and identify the Common Errors in Writing and Speaking.	CO2	To learn effective writing.	CO3	To read Technical proposals properly and make them to Write good technical reports.	CO4	Acquire Employment and Workplace communication skills.	CO5	Acquire communication skills at workplace
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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 ಪರಿಚಯಿಸುವುದು.
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, ಆಯ್ಯಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ಯಕ್ಕಿ ಲಕ್ಕಮ್ಮ.
2. ಕೀರ್ತನೆಗಳು : ಅದರಿದೇನು ಫಲ ಇದರಿದೇನು ಫಲ - ಪುರಂದರದಾಸರು
ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು
3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

1. ದಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗದಿಂದ ಅಯ್ಯ 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.ಜಿ. 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:

C01	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
C02	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
C03	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
C04	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕ ಹೆಚ್ಚಾಗುತ್ತದೆ.
C05	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.**

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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

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (22KBK17/27) 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 conversation.
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:

C01	To understand the necessity of learning of local language for comfortable life.
C02	To speak, read and write Kannada language as per requirement.
C03	To communicate (converse) in Kannada language in their daily life with kannada speakers.
C04	To Listen and understand the Kannada language properly.
C05	To speak in polite conversation.

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 conversation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವಜನಿಕತೆಗಳು ಮತ್ತು ಪ್ರತ್ಯಾಧಿಕಾರ 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 -ಸಪ್ರಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ - (ಆ, ಅದು, ಅವು, ಆದ್ದರಿಂದ) - 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. ಸ್ವಾಸ್ಥ್ಯ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು -Defective/Negative Verbs & Colour Adjectives

Module- 4

(03 hours of pedagogy)

1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು Permission, Commands, encouraging and Urging words (Imperative words and sentences)
2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಯಲ್ಲಿ ದ್ವಿವಿಧೀಯ 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- Comparative, 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. ದ್ವಿ, -ತ್, -ತು, -ಇತು, -ಆಗಿ, -ಅಲ್ಲ, -ಗ, -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 ಭಾಗಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

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

4. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈವಿಡಿಗಾಗಿ 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

Course Code	22 IDT 18/28	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	1:0:0:0	Exam Hours	1:30Min
Total Hours of Pedagogy	15 Hours Theory	Credits	01

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		03 Hours
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		03 Hours
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		03 Hours
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.		03 Hours
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		03 Hours
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 pre- sentation by the students on the learning from the workshop	
Text book: 1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengage learning (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 Business or 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 (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 different technique	
CO3	Identify the significance of reverse Engineering to Understand products	
CO4	Draw technical drawing for design ideas	

INTRODUCTION TO WEB PROGRAMMING			
Course Code	22PLC15A/25A	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	42 Hours	Credits	03
Prerequisite: Nil			
Course objectives:			
<ul style="list-style-type: none">■ To use the syntax and semantics of HTML and XHTML I■ To develop different parts of a web page■ To understand how CSS can enhance the design of a webpage.■ To create and apply CSS styling to a webpage■ To get familiarity with the JavaScript language and understand Document Object Model handling of Java Script			
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?			08 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			08 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.			09 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.			08 Hours

MODULES		Teaching Hours													
<p align="center">Module - V</p> <p>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</p>		<p align="center">09 Hours</p>													
<p>Course outcome (Course Skill Set) At the end of the course the student will be able to:</p>															
C01	Explain the historical context and justification for HTML over XHTML														
C02	Develop HTML5 documents and adding various semantic markup tags														
C03	Analyse various attributes, values and types of CSS														
C04	Implement core constructs and event handling mechanisms of JavaScript.														
<p align="center">List of Programs – 22ESC145/245Programming Assignments:</p> <p>1. Create an XHTML page using tags to accomplish the following:</p> <p>(i) A paragraph containing text "All that glitters is not gold". Bold face and italicize this text</p> <p>(ii) Create equation:</p> <p align="center">$x = 1/3(y_1^2 + z_1^2)$</p> <p>(iii) Put a background image to a page and demonstrate all attributes of background imageCreate unordered list of 5 fruits and ordered list of 3 flowers2.</p> <p>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</p> <table><tr><td rowspan="9">Department</td><td rowspan="3">Sem1</td><td><i>Subject A</i></td></tr><tr><td><i>Subject B</i></td></tr><tr><td><i>Subject C</i></td></tr><tr><td rowspan="3">Sem2</td><td><i>Subject E</i></td></tr><tr><td><i>Subject F</i></td></tr><tr><td><i>Subject G</i></td></tr><tr><td rowspan="3">Sem3</td><td><i>Subject H</i></td></tr><tr><td><i>Subject I</i></td></tr><tr><td><i>Subject J</i></td></tr></table> <p>3. Use HTML5 for performing following tasks:</p> <p>(i) Draw a square using HTML5 SVG , fill the square with green color and make 6px brown stroke width</p> <p>(ii) Write the following mathematical expression by using HTML5 MathML. d=x2-y2</p> <p>(iii) Redirecting current page to another page after 5 seconds using HTML5 meta tag</p> <p>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.</p>			Department	Sem1	<i>Subject A</i>	<i>Subject B</i>	<i>Subject C</i>	Sem2	<i>Subject E</i>	<i>Subject F</i>	<i>Subject G</i>	Sem3	<i>Subject H</i>	<i>Subject I</i>	<i>Subject J</i>
Department	Sem1	<i>Subject A</i>													
		<i>Subject B</i>													
		<i>Subject C</i>													
	Sem2	<i>Subject E</i>													
		<i>Subject F</i>													
		<i>Subject G</i>													
	Sem3	<i>Subject H</i>													
		<i>Subject I</i>													
		<i>Subject J</i>													

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~~¹ and new price is 40¹⁻⁶.

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.



Sign up today

Name:

E-mail:

Password:

Confirm password:



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.

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 outcome (Course Skill Set)

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

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)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	42 Hours	Credits	03

Prerequisite: Nil

Course objectives:

- Learn the syntax and semantics of the Python programming language.
- Illustrate the process of structuring the data using lists, tuples
- Appraise the need for working with various documents like Excel, PDF, Word and Others.
- Demonstrate the use of built-in functions to navigate the file system.
- Implement the Object Oriented Programming concepts in Python.

MODULES	Teaching Hours
<p style="text-align: center;">Module-I</p> <p>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</p>	08 Hours
<p style="text-align: center;">Module-II</p> <p>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,</p>	08 Hours
<p style="text-align: center;">Module-III</p> <p>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,</p>	09 Hours
<p style="text-align: center;">Module-IV</p> <p>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.</p>	08 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,.		09 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	
CO5	Demonstrate the concepts of Object-Oriented Programming in Python.	
List of Programs – 22PLC15B/ 25B		
Programming Exercises:1. 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. 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. 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. 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. 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 items6. 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. 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. 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. 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.		

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.

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 outcome (Course Skill Set)

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

C01	Demonstrate proficiency in handling loops and creation of functions.
C02	Identify the methods to create and manipulate lists, tuples and dictionaries.
C03	Develop programs for string processing and file organization
C04	Interpret the concepts of Object-Oriented Programming as used in Python.

INTRODUCTION TO C++ PROGRAMMING

Course Code	22PLC15C/25C	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	42 Hours	Credits	03

Course objectives.

- Understanding about object oriented programming and Gain knowledge about the capability to store information together in an object.
- Understand the capability of a class to rely upon another class and functions.
- Understand about constructors which are special type of functions.
- Create and process data in files using file I/O functions
- Use the generic programming features of C++ including Exception handling

MODULES	Teaching 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.	09 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	08 Hours
Module-III Inheritance & Polymorphism: Derived class Constructors, destructors-Types of Inheritance- Defining Derived classes, Single Inheritance, Multiple, Hierarchical Inheritance, Hybrid Inheritance.	08 Hours
Module-IV I/O Streams: C++ Class Hierarchy- File Stream-Text File Handling- Binary File Handling during file operations.	08 Hours
Module - V Exception Handling: Introduction to Exception - Benefits of Exception handling- Try and catch block Throw statement- Pre-defined exceptions in C++	09 Hours

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 outcome (Course Skill Set)

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

C01	Able to understand and design the solution to a problem using object-oriented programming concepts.
C02	Able to reuse the code with extensible Class types, User-defined operators and function Overloading.
C03	Achieve code reusability and extensibility by means of Inheritance and Polymorphism
C04	Implement the features of C++ including file stream and file handling
C05	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++.

C AND UNIX PROGRAMMING

Course Code	22PLC15D/25D	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	42 Hours	Credits	03

Prerequisite: Nil

Course objectives:

- To learn advanced concepts in pointers to functions, arrays, strings and structures.
- To learn Unix operating system and shell programming

MODULES	Teaching Hours
<p style="text-align: center;">Module-I</p> <p>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.</p>	09 Hours
<p style="text-align: center;">Module-II</p> <p>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.</p>	08 Hours
<p style="text-align: center;">Module-III</p> <p>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.</p>	08 Hours
<p style="text-align: center;">Module-IV</p> <p>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.</p>	09 Hours

<p style="text-align: center;">Module - V</p> <p>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.</p>	<p style="text-align: center;">09 Hours</p>
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Understanding Pointers in C, Yashwant Kanetkar, 3rd Edition, BPB Publisher 2.Unix concepts and applications, Sumitabha Das, 4th edition, Mcgraw Hill Education <p>Reference Books:</p> <ol style="list-style-type: none"> 1. The C Companion – Prentice-Hall, INC. Englewood Cliffs, New Jersey 07632 , Allen I. Holub- 1987 2. C Programming – A Modern Approach, K. N. King, 2nd Edition, Mcgraw Hill Education 3. Unix and Shell programming, Dehrouza A Forouzan, Richard F Gilberg, Cengage Learning India 1st Edition <p style="text-align: center;">List of Programs</p> <ol style="list-style-type: none"> 1. Write a C program to convert a number from given base b to decimal. 2. Write a C program to find largest/smallest element using pointers and dynamic memory allocation. 3. Write a C program to implement following built-in string functions using pointers : strcat() , strcmp() , strlen() , strcpy() 4. Write a C program to find substring of a string using function and pointers. 5. Write a C program to sort dynamic 2D-array of strings. 6. Write a C program to find whether a given matrix is symmetric or not using pointers. 7. Write a C program to create structure called course with structure members subject name and marks & display the same using dynamic memory allocation.. 8. Write a C program to find distance between two coordinates x & y using pointers to structures as function arguments. 9. Write a C program to demonstrate command line arguments argc() and argv() , such that the input given as argv[1] is converted to int , argv[2] is converted to float and open a file whose path is given as argv[3]. <p>Open-Ended-Program:</p> <ol style="list-style-type: none"> 10. Write a C program to declare and call a function using function pointers. <p>Part-B</p> <ol style="list-style-type: none"> 1. Practice all basic shell commands. 2. Write a Shell Script to display multiplication table using different looping statements . 3. Write a script to find whether a given number is odd or even. 4. Write a shell script to execute various shell commands using case statement. 5. Write a shell script to find sum of all digits from a given number. 6. Write a script to find greatest of three numbers. 7. Write a shell script to backup the files with .bak extension and display the completion message after every file is copied. 	

8. Write a shell script to check whether a given number is Armstrong or not.
9. Write a shell script to reverse a string and check whether a given string is palindrome or not.
10. Write a shell script to count the number of lines, words and characters of an input file.
11. Write a shell script to accept system time and display the message Good Morning / Good afternoon / Good Evening.
12. Write a shell script to find the factorial of a given number.
13. Write a shell script to remove duplicate lines from Files.

Open-Ended-Programs:

14. a) Write a shell script to display the appropriate message when no arguments are input, runs **grep** if two arguments are entered and displays an error message otherwise.
- 14b) Write shell script to check user input for null string values, when run without arguments it should turn interactive and takes two inputs from user. It then runs 14a. script with supplied inputs as arguments.
- 15) Write an interactive shell script that accepts input from the user and looks up a code list of the departments. Accept and validate a department code, display department name and employee-id on the terminal.

Course outcome (Course Skill Set)

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

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.

BASICS OF JAVA PROGRAMMING

Course Code	22PLC15E/25E	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	42 Hours	Credits	03

Prerequisite: Nil

Course objectives:

- Learn fundamental features of object oriented language and JAVA
- Set up Java JDK environment to create, debug and run simple Java programs.
- Learn object oriented concepts using programming examples.
- Study the concepts of importing of packages and exception handling mechanism

MODULES	Teaching Hours
<p style="text-align: center;">Module-I</p> <p>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</p>	09 Hours
<p style="text-align: center;">Module-II</p> <p>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</p>	08 Hours
<p style="text-align: center;">Module-III</p> <p>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</p>	08 Hours
<p style="text-align: center;">Module-IV</p> <p>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.</p>	09 Hours

<p style="text-align: center;">Module - V</p> <p>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.</p>	09 Hours										
<p style="text-align: center;">LIST OF PROGRAMS</p> <p>Programming Assignments</p> <ol style="list-style-type: none"> 1. Write a JAVA program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. 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 <p>Write a JAVA program to create n Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings.</p> <ol style="list-style-type: none"> 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 Of BoundException <p>Course outcome (Course Skill Set)</p> <p>At the end of the course the student will be able to:</p> <table border="1" data-bbox="259 1606 1421 1923"> <tr> <td>CO1</td><td>To illustrate basics of JAVA programming</td></tr> <tr> <td>CO2</td><td>To demonstrate working of operators in JAVA</td></tr> <tr> <td>CO3</td><td>To create classes and objects for applications</td></tr> <tr> <td>CO4</td><td>To develop simple programs based on polymorphism and inheritance</td></tr> <tr> <td>CO5</td><td>To describe the concepts of importing packages and exception handling mechanism</td></tr> </table>		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
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