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.

Website: www.pdacek.ac.in
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SCHEME & SYLLABUS (1ST YEAR)

BACHELOR DEGREE IN ENGINEERING

COMPUTER SCIENCE AND EINGINEERING STREAM
(CSE/CSD/ISE/AIML)

(With effect from 2022 Academic Year)

Outcome 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.

POOJYA 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 COMPUTER SCIENCE AND ENGINEERING STREAM (CSE/ISE/CSD/AIML) — Physics Group

Sl.No.	Course	Course Code	Course Title	Teaching Dept. / PSB	Lecture L	Tutorial T	Practical/ Drawing P	SDA S	Duration in Hours	CIE MARKS	SEE MARKS	TOTAL MARKS	Credits
1.	*ASC(IC)	22MATS11	Mathematics for CSE Stream-I	Maths	3	0	2	0	03	50	50	100	04
2.	#ASC(IC)	22PHYS12	Physics for CSE Stream	Chemistry	3	0	2	0	03	50	50	100	04
3.	ESC(IC)	22POP13	Principles of Programming using C	Respective Dept.	2	0	2	0	03	50	50	100	03
4.	ESC	22ESC143	Introduction to Electronics Engg.	Respective Engg. Dept.	3	0	0	0	03	50	50	100	03
5.	ETC-I	22ETC15X	Emerging Technology Courses	Any Engg. Dept.	3	0	0	0	03	50	50	100	03
6.	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	1.5	50	50	100	01
7.	HSMS	22KSK 17/27 22KBK 17/27	Samskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	1.5	50	50	100	01
8.	AEC/SDC	22IDT18	Innovation and Design Thinking	Humanities	1	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

*-22MATS21 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),

POOJYA 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)

Chemistry Group

II Semester COMPUTER SCIENCE AND ENGINEERING (CSE/ISE/CSD/AIML)

Sl.No.	Course	Course Code	Course Title	Teaching Dept. / PSB	Theory Lecture L	Tutorial T	Practical/ Drawing P	SDA S	Duration in Hours	CIE MARKS	SEE MARKS	TOTAL MARKS	Credits
1.	*ASC(IC)	22MATS21	Mathematics for CSE Stream-II	Maths	3	0	2	0	03	50	50	100	04
2.	#ASC(IC)	22CHE22	Chemistry for CSE Stream	Physics	3	0	2	0	03	50	50	100	04
3.	ESC	22CED23	Computer Aided Engineering Drawing	Civil Engg. Dept.	2	0	2	0	03	50	50	100	03
4.	ESC-II	22ESC242	Introduction to Electrical Engg.	Respective Engg. Dept.	3	0	0	0	03	50	50	100	03
5.	PLC	22PLC25X	Progrmming Language Courses	Any Engg. Dept.	2	0	2	0	03	50	50	100	03
6.	AEC	22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	1.5	50	50	100	01
7.	HSMS	22CO27	Indian Constitution	Humanities	1	0	0	0	1.0	50	50	100	01
8.	HSMS	22SFH28	Scientific Foundation of Health	Any Department	1	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
*-22MATS21 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 COMPUTER SCIENCE AND ENGINEERING STREAM -I
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	22MATS11	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	3-0-2-0	Total Marks	100
Contact Hours of Pedagogy	40 hours Theory + 12 Hrs. Lab slots	Exam Hours	03

Prerequisiste: Nil

Course objectives.
- **Familiarize** the importance of calculus associated with one variable and multivariable for computer science and engineering.
- **Analyze** computer science and engineering problems by applying Ordinary Differential Equations and Integral calculus .
- **Apply** the knowledge of modular arithmetic to computer algorithms.
- **Develop** the knowledge of Linear Algebra to solve the system of equations.

Modules	Hours
Module-1 Calculus **Introduction to polar coordinates and curvature relating to Computer Science and engineering.** Polar coordinates, Polar curves, angle between the radius vector and the tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems. **Self-study:** Center and circle of curvature, evolutes and involutes. **Applications:** Computer graphics, Image processing.	**08 Hours**
Module-2 Series Expansion and Multivariable Calculus **Introduction of series expansion and partial differentiation in Computer Science & Engineering applications.** Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms – L'Hospital's rule-Problems. Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables. Problems. **Self-study:** Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint **Applications:** Series expansion in computer programming, Errors and approximations, calculators	**08 Hours**

Module-3 Ordinary Differential Equations (ODEs) of first order **Introduction to first-order ordinary differential equations pertaining to the applications for** **Computer Science & Engineering.** Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations, Integrating factors on $\dfrac{1}{N}\left(\dfrac{\partial M}{\partial y}-\dfrac{\partial N}{\partial x}\right)$ and $\dfrac{1}{M}\left(\dfrac{\partial N}{\partial x}-\dfrac{\partial M}{\partial y}\right)$. Orthogonal trajectories, L-R & C-R circuits. Problems. **Non-linear differential equations:** Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations. Problems. **Self-Study:** Applications of ODEs, Solvable for x and y. **Applications of ordinary differential equations:** Rate of Growth or Decay2	**08 Hours**
Module-4 Integral Calculus **Introduction to Integral Calculus in Computer Science & Engineering.** **Multiple Integrals:** Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems. **Beta and Gamma functions:** Definitions, properties, relation between Beta and Gamma functions. Simple Problems. **Self-Study:** Center of gravity, Duplication formula. **Applications:** Antenna and wave propagation, Calculation of optimum value in various geometries. Analysis of probabilistic models.	**08 Hours**
Module-5 Linear Algebra **Introduction of linear algebra related to Computer Science & Engineering.** Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigenvalues and Eigenvectors, Rayleigh's power method to find the dominant Eigenvalue and Eigenvector. **Self-Study:** Solution of system of equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem. **Applications:** Boolean matrix, Network Analysis, Markov Analysis, Critical point of a network system. Optimum solution.	**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 graphicalrepresentation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigen vectors and find the largest and smallest eigen value byRayleigh 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 and learn the notion of partial differentiation to compute rate of change of multivariate functions
CO 2	analyze the solution of linear and nonlinear ordinary differential equations
CO 3	Apply the concept of change of order of integration and variables to evaluate multipleintegrals and their usage in computing area and volume.
CO 4	make use of matrix theory for solving for system of linear equations and computeeigen values and eigenvectors
CO 5	familiarize with modern mathematical tools namelyMATHEMATICA/MATLAB/ PYTHON/ SCILAB

PHYSICS FOR COMPUTER SCIENCE AND ENGINEERING STREAM

Course Code	22PHYS12/22	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	3:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 Hours Theory + 12 Hrs. Lab slots	Credits	04

Prerequisite:
Properties of light, Wave–Particle dualism, Classical Free Electron Theory, Basics of Electrical conductivity, Motion in one dimension, Probability

Course objectives.
- To study the essentials of photonics and its application in computer science.
- To study the principles of quantum mechanics and its application in quantum computing.
- To study the electrical properties of materials
- To study the essentials of physics for computational aspects like design and data analysis.

Module-1	**Hours**
Laser and Optical Fibers: **LASER**: Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Metastable State, Requisites of a laser system, Semiconductor Diode Laser, Applications: Bar code scanner, Laser Printer, Laser Cooling(Qualitative), Numerical Problems. **Optical Fiber**: Principle and Structure, Propagation of Light, Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Modes of Propagation, RI Profile, Classification of Optical Fibers, Attenuation and Fiber Losses, Applications: Fiber Optic networking, Fiber Optic Communication. Numerical Problems **Pre requisite: Properties of light Self-learning: Total Internal Reflection**	**(8 Hours)**
Module-2	
Quantum Mechanics: de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Quantization of Energy States, Waveforms and Probabilities. Numerical Problems. **Pre requisite: Wave–Particle dualism Self-learning: de Broglie Hypothesis**	**(8 Hours)**

Module-3 **Dielectric Properties:** polar and non-polar dielectrics.. Types of polarization mechanism(Electrical Polarization Mechanisms). Equation for internal field in liquids and solids (1D case & 3D solid). Classius-Mossoti equation(Derivation). Frequency dependence of dielectric constant/polarization. Numerical. Ferroelectric materials, Characteristic properties: Hysteresis loop and Curie Temperature. Application of dielectrics in transformers, Capacitors, Electrical Insulation. Numerical Problems. .**Pre-requisites: Classical Free Electron Theory** **Self-learning: Dielectrics Basics**	**(8 Hours)**
Module-4 **Electrical Properties of Materials and Applications Electrical Conductivity in metals** Resistivity and Mobility, Concept of Phonon, Matheissen's rule, Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory, Fermi Energy, Density of States, Fermi Factor, Variation of Fermi Factor With Temperature and Energy. Numerical Problems. **Superconductivity** Introduction to Super Conductors, Temperature dependence of resistivity, Meissner's Effect, Critical Field, Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), Quantum Tunnelling, High Temperature superconductivity, Josephson Junctions (Qualitative), DC and RF SQUIDs (Qualitative), Applications in Quantum Computing: Charge, Phase and Flux qubits, Numerical Problems. **Pre requisites: Basics of Electrical conductivity Self-learning: Resistivity and Mobility**	**(8 Hours)**
Module-5 **Applications of Physics in computing:** **Physics of Animation**: Taxonomy of physics based animation methods, Frames, Frames per Second, Size and Scale, Weight and Strength, Motion and Timing in Animations, Constant Force and Acceleration, The Odd rule, Odd-rule Scenarios, Motion Graphs, Examples of Character Animation: Jumping, Parts of Jump, Jump Magnification, Stop Time, Walking: Strides and Steps, Walk Timing. Numerical Problems **Statistical Physics for Computing**: Descriptive statistics and inferential statistics, Poisson distribution and modeling the probability of proton decay, Normal Distributions (Bell Curves), Monte Carlo Method: Determination of Value of ð. Numerical Problems. **Pre requisites: Motion in one dimension, Probability Self-learning: Frames, Frames per Second**	**(8 Hours)**

Laboratory Component
Any Ten Experiments have to be completed from the list of experiments
Note: The experiments have to be classified into
   (a) Exercise
   (b) Demonstration
   (c) Structured Inquiry
   (d) Open Ended
Based on the convenience classify the following experiments into above categories. Select at least one simulation/spreadsheet activity.

List of Experiments

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

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

1. Solid State Physics, S O Pillai, New Age International Private Limited, 8th Edition, 2018.
2. Engineering Physics by Gupta and Gour, Dhanpat Rai Publications, 2016 (Reprint).
3. A Textbook of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand. & Company Ltd, New Delhi.
4. Concepts of Modern Physics, Aurthur Beiser, McGrawhill, 6th Edition, 2009.
5. Lasers and Non Linear Optics, B B Loud, New age international, 2011 edition.
6. A Textbook of Engineering Physics by M.N. Avadhanulu, P G. Kshirsagar and T V S Arun Murthy, Eleventh edition, S Chand and Company Ltd. New Delhi-110055.
7. Quantum Computation and Quantum Information, Michael A. Nielsen & Isaac L. Chuang, Cambridge Universities
   Press, 2010 Edition.
8. Quantum Computing, Vishal Sahani, McGraw Hill Education, 2007 Edition.
9. Quantum Computing – A Beginner's Introduction, Parag K Lala, Indian Edition, Mc GrawHill, Reprint 2020.
10. Engineering Physics, S P Basavaraj, 2005 Edition, Subhash Stores.
11. Physics for Animators, Michele Bousquet with Alejandro Garcia, CRC Press, Taylor & Francis, 2016.

12. Quantum Computation and Logic: How Quantum Computers Have Inspired Logical Investigations, Maria Luisa Dalla Chiara, Roberto Giuntini, Roberto Leporini, Giuseppe Sergioli, Trendsin Logic, Volume 48, Springer.
13. Statistical Physics: Berkely Physics Course, Volume 5, F. Reif, McGraw Hill.
    Introduction to Superconductivity, Michael Tinkham, McGraw Hill, INC, II Edition

Course outcome (Course Skill Set)
At the end of the course the student will be able to:
  CO1 **Describe** the principles of LASERS and Optical fibers and their relevant applications.
  CO2 **Discuss** the basic principles of the Quantum Mechanics and its application in Quantum Computing.
  CO3 **Summarize** the essential properties of Dielectric superconductors and its applications in qubits.
  CO4 **Illustrate** the application of physics in material sensing temperature resistance sensing materials.
  CO5 **Practice** working in groups to conduct experiments in physics and **perform** precise and honest measurements

PRINCIPLES OF PROGRAMMING USING C

Course Code	22POP13/23	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	30 Hours Theory + 12 Hrs. Lab slots	Credits	03

Prerequisite: Nil

Course Objectives:

■ Learn the concepts of C Language.

■ Develop skills to solve computational problem

MODULES	Teaching Hours
Module-I **Algorithms, Flowcharts ,Introduction to C:** Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types. **Operators and Expressions, Managing Input/ Output :** Arithmetic operators, relational operators, logical operators, assignment operators, increment/ decrement operators, conditional operators, bit wise operators, special operators. Evaluation of expression, precedence of arithmetic operators, type conversions in expression, operator precedence and associativity. Formatted Input and Output. Examples & exercises.	**06 Hours**
Module-II **Decision making and branching:** Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements. **Decision Making and Looping:** While statement, Do-While statement, For statement, jumps in loop. Examples & exercises.	**06 Hours**
Module-III **Arrays:** One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises. **Strings:** Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.	**06 Hours**
Module-IV **Functions and Recursion :** Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises. **Structures and Unions:** Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures. **Unions**: Union**,** Size of Structures, bit fields , examples & exercises.	**06 Hours**

Module-V **Pointers:** Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer , pointer expressions, Examples & exercises. **File Management:** Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples & exercises.	**06 Hours**

Text book:
1. E. Balagurusamy, "Programming in ANSI C", Tata Mcgraw Hill Education Private Limited– V Edition, 2016

Reference books:
1. Herbert Schildt, **"**Complete Reference in C",Fourth Edition, Tata McGraw Hill Publication, 2017
2. Yashwant P. Kanetakar, "Let us C**",** Fifth Edition, BPB Publications, 2016.
3. Brian W Kernighan & Dennis M Ritchie   **"** The C Programming Language", Prentice 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.

Practice Programs:

1.   Write a C program to demonstrate static and dynamic input / output (scanf / printf) statements.
2.   Write a C program to demonstrate reading and displaying static and dynamic array elements.
3.   Write a C program to swap two numbers using different types of functions based on parameter passing.
4.   Write a C program to demonstrate pointer arithmetic using different types of pointers (int, float, char).
5.   Write a C program to demonstrate passing arrays (1D, 2D),strings, structure as a parameters within functions.

Programming Assignments:

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

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

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

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

```
            1
          1   2   1
        1   2   3   2   1
      1   2   3   4   3   2   1
   _____
```

nth row

Write and execute the following programs in C using arrays.

5 Implement Binary Search on Integers.

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

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

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

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

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

Write and execute the following program in C using Structure.

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

Write and execute the following program in C using pointers.

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

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

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

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

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

INTRODUCTION TO ELECTRONICS ENGINEERING

Course Code	22ESC143/243	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	30 Hours Theory + 12 Hrs. Lab slots	Credits	03

Prerequisite: Nil

Course objectives:

- To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.
- To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
- Professionalism & Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication,teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career

Modules	Teaching Hours
Module 1 **Power Supplies:** Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers. **Amplifiers:** CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes.	**08 Hours**
Module - 2 **Operational amplifiers**: Ideal op-amp; characteristics of ideal and practical op-amp. **Practical op-amp circuits:** Inverting and non-inverting amplifiers, voltage follower, summer, subtractor, integrator, differentiator. **Oscillators:** Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator (using op-amp), Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)	**09 Hours**
Module - 3 **Boolean Algebra and Logic Circuits:** Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates **Combinational logic:** Introduction, Design procedure, Adders- Half adder, Full adder.	**08 Hours**

Module - 4	
Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC **Sensors and Interfacing:** Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display.	**08 Hours**
Module-5	
Analog Communication Schemes: Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky) **Digital Modulation Schemes:** Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.	**09 Hours**

Text book:
1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015. DOI https://doi.org/10.4324/9781315737980. eBook ISBN9781315737980 2nd
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-2030417-84.D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India),Private Limited, 2018

Reference Books:
1.

2.

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

CO1 : Design basic power supply & study concept of amplifiers.
CO2 : To analyze working of op-amp with its applications & to study oscillators.
CO3 : Develop competence knowledge to construct basic digital circuit bymake use of basic gate and its function.
CO4 : Understand the concept of embedded system. Study role of Sensor andits interfacing.
CO5 : To study various analog and digital modulation and demodulation techniques

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
Module-I **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,	**03 Hours**
Module-II **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.	**03 Hours**
Module-III **Basic English Communicative Grammar and Vocabulary PART - I**: Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes. Introduction to Vocabulary - Definition and Importance of vocabulary, All Types of Vocabulary, ways to improve vocabulary – Exercises on it	**03 Hours**
Module-IV **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,	**03 Hours**

MODULES	Teaching Hours
Module-V **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.	**03 Hours**

Text Books:

1. Communication Skills by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
2. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.
3. Scotofer, contemporary business communication, Biztant ra
4. Chaturvedi P D & Mukesh chaturvedi - Business communication:Concepts, cases & applications-2/e, pearson education.
5. Essential of Business communication – Rajendra Pal and J.S Korlhall – Sultan Chand & Sons, New Delhi.

Reference Books:

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

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

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.

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

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

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

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

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

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ಡಾ.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. ಮೇಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

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

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

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

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

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

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course (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 conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)
ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

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 ಓದುಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

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3. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832311) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.

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

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

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

Module - 1 (03 hours of pedagogy)

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.

2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription

3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2 (03 hours of pedagogy)

1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - Possessive forms of nouns, dubitive question and Relative nouns

2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative, Quantitative and Colour Adjectives, Numerals

3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು –ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಆದು, ಅವು, ಅಲ್ಲಿ) –Predictive Forms, Locative Case

Module - 3 (03 hours of pedagogy)

1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - Dative Cases, and Numerals

2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು –Ordinal numerals and Plural markers

3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು –Defective/Negative Verbs & Colour Adjectives

Module- 4 (03 hours of pedagogy)

1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು Permission, Commands, encouraging and Urging words (Imperative words and sentences)

2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು Accusative Cases and Potential Forms used in General Communication

3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs

4. ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparitive, Relationship, Identification and Negation Words

Module - 5 (03 hours of pedagogy)

1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ಎವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs

2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms

3. Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation

University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ
ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ
ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,
ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

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

2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ 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 ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

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

INNOVATION AND DESIGN THINKING

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

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	
Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test	03 Hours
Teaching-Learning Process — 8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop	

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

GREEN BUILIDNG

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

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 Mösle and Michael Schwarz "Green Building - Guidebook for Sustainable Architecture" Springer, 2010

3. Environmental Engineering vol-II By S.K.Gerg, Khanna publications

Reference books:
1. Osman Attmann Green Architecture Advanced Technologies and Materials. McGraw Hill, 2010. Michael F. Ashby Materials and the Environment, Elsevier, 2009.
3. Jerry Yudelson Green building Through Integrated Design.McGraw Hill, 2009.
4. Mili M. Ajumdar (Ed) Energy Efficient Building in India.Teri and Mnes, 2001 / 2002.
5. Low Energy Cooling For Sustainable Buildings. John Wiley and Sons Ltd, 2009.
6.Green My Homel: 10 Steps to Lowering Energy Costs and Reducing Your Carbon Footprint,by Dennis
C. Brewer, ISBN:9781427798411, Publisher: Kaplan Publishing, Publication Date: October 2008.
7. B. Givoni, Man, Climate and Architecture Elsevier, 1969.
8. T. A. Markus and E. N. Morris Buildings Climate and Energy. Pitman, London, 1980. ArvindKishan et al (Ed)

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

MODULES	Hours
Module-I **Solar Resource and Radiation** **An introduction to Energy Sources:** Energy consumption as a measure of Prosperity, world energy futures and energy sources and their availibity. **Solar Resource and Radiation:** Solar resources, Quantifying solar radiation, The effect of the Earth's atmosphere on solar radiation, Sun geometry, Geometry for installing solar arrays.	**09 Hours**
Module - II **Solar thermal energy The solar energy option – An overview of thermal applications:** Devices for thermal collection and storage, thermal applications and some observations.	**09 Hours**
Module-III **PV Industry and Technology** **PV Industry and Technology:** Semiconductor devices, Mainstream technologies, Mono crystalline silicon, Multi crystalline/polycrystalline silicon, Thin film solar cells, Contacts, Buying solar modules, Standards, Certifications, Warranties, Emerging technologies, Dye-sensitized solar cells, Sliver cells, Hetero junction with intrinsic thin layer (HIT) photovoltaic cells, Solar concentrators. **PV Cells, Modules and Arrays:** Characteristics of PV cells, Graphic representations of PV cell performance, Connecting PV cells to create a module, Specification sheets, Creating a string of modules, Creating an array, Photovoltaic array performance, Irradiance, Temperature, Shading.	**08 Hours**
Module -IV **Inverters and Other System Components** **Inverters and Other System Components:** Introduction, Inverters, Battery inverters, Grid-interactive inverters, Transformers, Mainstream inverter technologies, String inverters, Multi-string inverter, Central inverter, Modular inverters, Inverter protection systems, Self-protection, Grid protection, Balance of system equipment: System equipment excluding the PV array and inverter, Cabling, PV combiner box, Module junction box, Circuit breakers and fuses, PV main disconnects/isolators, Lightning and surge protection, System monitoring, Metering, Net metering, Gross metering. Mounting Systems: Roof mounting systems, Pitched roof mounts, Pitched roof mounts for tiled roofs, Pitched roof mounts for metal roofs Rack mounts, Direct mounts, Building-integrated systems, Ground mounting systems, Ground rack mounts, Pole mounts, Sun-tracking systems, Wind loading.	**08 Hours**

MODULES	Hours
Module-V **Installing Grid-connected PV Systems** **Installing Grid-connected PV Systems:** PV array installation, DC wiring, Cabling routes and required lengths, Cable sizing, PV combiner box, System grounding/earthling, Inverter installation, Installation checklist, Interconnection with the utility grid, Required information for installation, Safety. **System Commissioning:** Introduction, Final inspection of system installation, Testing, Commissioning, System documentation. **System Operation and Maintenance:** System maintenance, PV array maintenance, Inverter maintenance, System integrity, Troubleshooting, Identifying the problem, Troubleshooting PV arrays, Troubleshooting underperforming systems, Troubleshooting inverters, Other common problems.	**08 Hours**

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

Reference Books

1. Chetan Singh Solanki, Solar Photovoltaic Technology And Systems - A Manual For Technicians, Trainers And Engineers, PHI Publication New Delhi- 2013 Edition.

2.Geoff Stapleton Susan Neill, Grid-connected Solar Electric Systems: The Earthscan Expert

Handbook for Planning, Design and Installation, Routledge; 1st edition 2021.

3. Chetan Singh Solanki, Solar Photovoltaic's: Fundamentals, Technologies And Applications , PHI Publication New Delhi, 3rd Edition

4. GD Rai, Non Convention Sources of Energy, Khanna Publishers, New Delhi, 5th Edition

5..SP Sukhatme, JK Nayak, Solar Energy, TMH Publishing Company limited New Delhi, 3rd Edition

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

CO1	Understand the needs of energy and discuss the solar radiation.
CO2	Appreciate the solar thermal energy applications.
CO3	Discuss the PV technology and Industry.
CO4	Identify the components of PV system and Inverters.
CO5	Understand the installation of PV system and O&M of PV systems

RENEWABLE ENERGY SOURCES

Course Code	22ETC15C/25C	CIE Marks	50
Course Type (Theory/Practical/Integrated)	THEORY	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	42 Hours Theory	Credits	03

MODULES	Hours
Module-I **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	**09 Hours**
Module - II **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	**09 Hours**
Module-III **WIND ENERGY:** Wind Data and Energy Estimation – Wind Energy Conversion Systems – Performance – Site Selection— Safety and Environmental Aspects. **BIOMASS ENERGY:** Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies-fixed dome and floating type; Urban waste to energy conversion. Biomass Applications.	**08 Hours**
Module -IV **Tidal Power:** Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, advantages and limitations. **Ocean Thermal Energy Conversion:** Principle of working, OTEC power stations in the world, advantages and disadvantage with OTEC.	**08 Hours**
Module-V **Green Energy:** Introduction, Fuel cells: Classification of fuel cells – H_2; Operating principles, Zero energy Concepts. Benefits of hydrogen energy, hydrogen production technologies (electrolysis method only), hydrogen energy storage, applications of hydrogen energy, problem associated with hydrogen energy. **Geothermal Energy.** Introduction-, geothermal filed and its applications. Small Hydropower generation.	**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 EnergyResources, Shobh Nath Singh, Pearson, 2018

Course outcome (Course Skill Set)	

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

CO1	Describe the environmental aspects of renewable energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
CO2	Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation.
CO3	Understand the conversion principles of wind and tidal energy
CO4	Understand the concept of biomass energy resources and green energy
CO5	Acquire the basic knowledge of ocean thermal energy conversion and hydrogen energy.

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

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**
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 Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014.
3. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.

Course outcome (Course Skill Set)

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

CO1	Describe the evolution of IoT, IoT networking components, and addressing strategies in IoT.
CO2	Classify various sensing devices and actuator types.
CO3	Demonstrate the processing in IoT.
CO4	Explain Associated IOT Technologies
CO5	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·

■ 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 Attackes, 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:** Introdcution, Historical Background of Cyberforensics, Digital Foresics, Science, Need for Computer Foresics, Cyber Forensics and Digital Evidence, Digital Forensic Life cycle, Chain of Custody Concepts, network forensics. Textbook:1 Chapter 7 (7.1. to 7.5, 7.7 to 7.9)	**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:

CO1	Explain the cybercrime terminologies
CO2	Describe Cyber offenses and Botnets
CO3	Illustrate Tools and Methods used on Cybercrime
CO4	Explain Phishing and Identity Theft
CO5	Justify the need of computer forensics

MATHEMATICS FOR COMPUTER SCIENCE AND ENGINEERING STREAM -II
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	**22 MATS21**	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 slots	Credits	04

COURSE OBJECTIVES

- **Familiarize** the importance Vector calculus.
- **Learn** vector spaces and linear transformations**.**
- **Develop** the knowledge of numerical methods and apply them to solve transcendental and differential equations..

MODULES	Hours
Module-1 Vector Calculus **Introduction to Vector Calculus in Computer Science & Engineering.** Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems. **Curvilinear coordinates:** Scale factors, base vectors, Cylindrical polar coordinates, Spherical polar coordinates, transformation between cartesian and curvilinear systems, orthogonality. Problems. **Self-Study:** Volume integral. **Applications:** Conservation of laws, Electrostatics, Analysis of streamlines.	**08 Hours**
Module-2 Ordinary Differential Equations of higher order **Importance of higher-order ordinary differential equations in Computer Science & Engineering applications.** Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations - Problems. **Self-Study:** Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients. **Applications:**.	**08 Hours**
Module-3 Vector Space and Linear Transformations **Importance of Vector Space and Linear Transformations in the field of Computer Science & Engineering.** **Vector spaces:** Definition and examples, subspace, linear span, Linearly independent and dependent sets, Basis and dimension. Problems. **Linear transformations**: Definition and examples, Algebra of transformations, Matrix of a linear transformation. Change of coordinates, Rank and nullity of a linear operator, rank-nullity theorem. Inner product spaces and orthogonality. Problems. **Self-study:** Angles and Projections. Rotation, reflection, contraction and expansion. **Applications:** Image processing, AI & ML, Graphs and networks, computer graphics.	**08 Hours**

MODULES	Hours
Module-4 Numerical Methods -1 **Importance of numerical methods for discrete data in the field of EC & EE engineering applications.** Solution of algebraic and transcendental equations: Regula-Falsi method and Newton-Raphson method (only formulae). Problems. Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems. **Self-Study:** Bisection method, Lagrange's inverse Interpolation. **Applications:** Estimating the approximate roots, extremum values.	08 Hours
Module-5 Numerical Methods -2 N**umerical integration**: Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof). Problems. **Introduction to various numerical techniques for handling EC & EE applications.** **Numerical Solution of Ordinary Differential Equations (ODEs):** Numerical solution of ordinary differential equations of first order and first degree – Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor corrector formula (No derivations of formulae). Problems. **Self-Study:** Adam-Bashforth method. **Applications:** Estimating the approximate solutions of ODE for electric circuits.	08 Hours

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

1	Finding gradient, divergent, curl and their geometrical interpretation
2	Verification of Green's theorem
3	Solutions of Second-order ordinary differential equations with initial/boundaryconditions
4	Computation of basis and dimension for a vector space and Graphical representation oflinear transformation
5	Visualization in time and frequency domain of standard functions
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphsonmethod
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'spredictor-corrector method

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

Semester End Examination (SEE):
Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the course (duration 03 hours)
1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

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

CHEMISTRY FOR COMPUTER SCIENCE & ENGINEERING STREAM

Course Code	22CHES12/22	CIE Marks	50
Course Type (Theory/Practical/ Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)[1]	3:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 Hours Theory + 12 Hrs. Lab slots	Credits	04

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.

MODULES	Hours
MODULE 1: Sensors and Energy Systems **Sensors**: Introduction, working principle and applications of Conductometric sensors (Strong Acid with Strong Base), Electrochemical sensor (Potentionmetric tritration), and Optical sensors(Colourimeter). Sensors for the measurement of dissolved oxygen (DO). Electrochemical sensors for the pharmaceuticals, surfactants, hydrocarbons. Electrochemical gas sensors for SOx and NOx. Disposable sensors in the detection of biomolecules and pesticides. **Energy Systems**: Introduction to batteries, construction, working and applications of Lithium ion and Sodium ion batteries. Quantum Dot Sensitized Solar Cells (QDSSC's)- Principle, Properties and Applications. **Self-learning:** Types of electrochemical sensor, Gas sensor - O2 sensor, Biosensor - Glucose sensors.	**08 Hours**
Module-2: E-Waste Management **E-Waste:** Introduction, sources of e-waste, Composition, Characteristics, and Need of e- waste management. Toxic materials used in manufacturing electronic and electrical products, health hazards due to exposure to e-waste. Recycling and Recovery: Different approaches of recycling (separation, thermal treatments, hydrometallurgical extraction, pyrometallurgical methods, direct recycling). Extraction of gold from E-waste. Role of stake holders in environmental management of e-waste (producers, consumers, recyclers, and statutory bodies). **Self-learning:** Impact of heavy metals on environment and human health.	**08 Hours**

MODULE 3: Corrosion and Electrode System **Corrosion Chemistry:** Introduction, electrochemical theory of corrosion, types of corrosion-differential metal and differential aeration. **Corrosion control** : Defenetion of metal coating - Anodic coating ex. galvanization(metal coating). Inroganic coating - anodization, cathodic protection- sacrificial and impress anode method. Factors affecting corrosion – Temperature, EMF, pH, relative anode and cathode area, polarization. **Electrode System**: Introduction, types of electrodes. Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode - Introduction, calomel electrode – construction, working and applications of calomel electrode. Concentration cell– Definition, construction and Numerical problems. **Self-learning:** IR and UV- Visible spectroscopy.	**08 Hours**
Module-4: Macromolecules for Engineering Applications **Polymers**: Introduction, types of polymerization, free radical mechanism of addition polymerization, techniques of addition polymerization, molecular weight; number average and weight average, numerical problems. Synthesis, properties and industrial applications of polyvinylchloride (PVC) and polystyrene. **Conducting polymers** – synthesis and conducting mechanism of Polyacetylene. **Fibers:** Introduction, synthesis, properties and industrial applications of Kevlar and Polyester. **Plastics:** Introduction, synthesis, properties and industrial applications of poly(methyl methacrylate) (PMMA) and Teflon. **Self-learning:** Biodegradable polymer: Introduction, synthesis, properties and applications of polylactic acid (PLA).	**08 Hours**
Module-5: Water technology and Nanotechnology **Water technology:** Introduction, water parameters (physical- colour, taste, odour and temperature, Chemica- pH, acidity, alkaline, Biological-Algae, virus and bacteria, 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. Forward osmosis: Introduction, Process and applications. **Nanotechnology:** Introduction, properties and engg.application of carbon nanotubes, grapheme and nanomaterials for water treatment(metal oxide) **Self-learning:** Introduction, classification, properties and application of silicon carbide.	**08 Hours**

PRACTICAL MODULE

A – Demonstration (any two) offline/virtual:
A1. Chemical Structure drawing using software: ChemDraw or ACD/ChemSketch
A2. Determination of strength of an acid in Pb-acid battery A3: Synthesis of Iron-oxide Nanoparticles
A4. Electrolysis of water

B – Exercise (compulsorily any 4 to be conducted):
B1. Conductometric estimation of acid mixture
B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$
B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
B4. Determination of rate of corrosion of mild steel by weight loss 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: Evaluation of acid content in beverages by using pH sensors and simulation. D2. Construction of photovoltaic cell.
D3. Design an experiment to Identify the presence of proteins in given sample.
D4. Searching suitable PDB file and target for molecular docking

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

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
3. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
4. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
5. Engineering Chemistry – I, D. Grour Krishana, Vikas Publishing
6. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.
7. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2nd Edition, 2016.
8. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
9. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSC Publishing, 2005.
10. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
11. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
12. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley–Blackwell , 2012
13. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, Elzbieta Frackowiak, Wiley-VCH; 1st edition, 2013.
14. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017. Dr. H. Panda,
15. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
16. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The

National Academies Press. doi: 10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher, Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. John Wiley & Sons, 2010
19. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan, Nirali Prakashan, 2020
20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch Seventh Edition, Cengage Learning, 2020
21. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers, 4th Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition, 2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3rd Edition2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2nd Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa Iyengar., Subash Publications, 5th Edition, 2014
27. "Engineering Chemistry", O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint, 2015.
28. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,
29. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

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

CO1.	Identify the terms and processes involved in scientific and engineering applications
CO2.	Explain the phenomena of chemistry to describe the methods of engineering processes
CO3.	Solve for the problems in chemistry that are pertinent in engineering applications
CO4.	Apply the basic concepts of chemistry to explain the chemical properties and processes
CO5.	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)	THEORY	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: Nil

Course Objectives

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.

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**

Module-3	
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).**	**08 Hours**

Module-4	
Development of Lateral Surfaces of Solids: Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only. Development of lateral surfaces of their frustums and truncations.	**08 Hours**

Module-5	
Multidisciplinary Applications & Practice (For CIE Only): **Free hand Sketching;** True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc **Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts 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.	**08 Hours**

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

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.

Course Outcomes

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

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

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

CO 3. Develop the lateral surfaces of the object

CO 4. Create a Drawing views using CAD software.

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

INTRODUCTION TO 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
Module-I **Introduction:** Conventional and non-conventional energy resources; **Power Generation:** Hydel, Nuclear, Solar & wind power generation (Block Diagram approach). **Electromagnetism:** Faraday Laws of Electromagnetic Induction, Fleming's rules, Lenz's law, types of EMF and numerical.	**8 hrs**
Module-II **A.C. Fundamentals:** Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical). **Three Phase Circuits:** Advantages, three phase connections (Star & Delta) (Excluding Derivations).	**8 hrs**
Module-III **DC Machines:** **DC Generator**: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical. **DC Motor:** Principle of operation, back emf and its significance. Torque equation, types of motors, Applications of DC motors. Simple numerical. 3-point starter.	**8 hrs**

Module-IV	
Transformers: Necessity of transformer, principle of operation, Types and construction of singlephase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical. Three-phase induction **Motors:** Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance simple numerical.	**8 hrs**

Module-V	
Domestic Wiring: Requirements, Types of wiring: casing, capping. Two way and three way control of load. **Electricity Bill**: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. **Equipment Safety measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. **Personal safety measures:** Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	**8 hrs**

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

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

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

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

PROFESSIONAL WRITING SKILLS IN ENGLISH

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

Prerequisite: NIL

Course objectives:

The course Communicative English (22PWS26) will enable the students
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
Module-I **Identifying Common Errors in Writing and Speaking English:** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.	**03 Hours**
Module-II **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.	**03 Hours**
Module-III **Technical Reading and Writing Practices**: Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing - Types of Technical Proposals, Characteristics of Technical Proposals and basic principles of technical writing. Grammar – Cloze Test and Theme Detection Exercises	**03 Hours**
Module-IV **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	**03 Hours**

MODULES	Teaching Hours
Module-V **Professional Communication at Workplace:** 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.	**03 Hours**

Text Books:

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.

Reference Books:

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

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

CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To 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

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:-

- ■ 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 **Introduction to Indian constitution** : The Constituent Assembly of India. Sources and Features of the Indian Constitution. Preamble to the Constitution of India.	**03 Hours**
Module-II **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	**03 Hours**
Module-III **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	**03 Hours**
Module-IV **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	**03 Hours**

MODULES	Teaching Hours
Module-V **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	**03 Hours**

Text Books :

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.

Reference Books :

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.

https://legislative.gov.in/constitution-of-india
https://www.constitutionofindia.net/

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

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

SCIENTIFIC FOUDATIONS 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
Module-I **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psycho-logical disorders-Methods to improve good psychological health, Changing health habits for good health.	**03 Hours**
Module-II **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & over-weight disorders and its management, Eating disorders, Fitness components for health, Wellness and physical function, How to avoid exercise injuries.	**03 Hours**
Module-III **Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic in-stincts of life (more than a biology), Changing health behaviours through social engineering.	**03 Hours**

Module-IV	03 Hours
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.	

Module-V	03 Hours
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.	

Text book:

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

Reference books:

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

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

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

INTRODUCTION TO WEB PROGRAMMING

Course Code	22PLC15A/25A	CIE Marks	50
Course Type	INTEGRATED	SEE Marks	50
(Theory/Practical/Integrated)		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 use the syntax and semantics of HTML and XHTML l

■ 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
Module - V **Introduction to JavaScript: Functions, DOM, Forms, and Event Handlers :** History of JavaScript, Hello World Web Page, Buttons, Functions, Variables, Identifiers, Assignment Statements and Objects, Document Object Model, Forms and How They're Processed: Client-Side Versus Server-Side, form Element, Controls, Text Control, Accessing a Form's Control Values, reset and focus Methods	**09 Hours**

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

CO1	Explain the historical context and justification for HTML over XHTML
CO2	Develop HTML5 documents and adding various semantic markup tags
CO3	Analyse various attributes, values and types of CSS
CO4	Implement core constructs and event handling mechanisms of JavaScript.

List of Programs – 22ESC145/245Programming Assignments:
1. Create an XHTML page using tags to accomplish the following:
   (i) A paragraph containing text "All that glitters is not gold". Bold face and italicize this text
   (ii) Create equation:

$$x = 1/3(y_1^2 + z_1^2)$$

   (iii) Put a background image to a page and demonstrate all attributes of background imageCreate unordered list of 5 fruits and ordered list of 3 flowers2.

2. Create following table using XHTML tags. Properly align cells, give suitable cell padding and cell spacing, and apply background color, bold and emphasis necessary

Department	Sem1	Subject A
		Subject B
		Subject C
	Sem2	Subject E
		Subject F
		Subject G
	Sem3	Subject H
		Subject I
		Subject J

3. Use HTML5 for performing following tasks:
(i) Draw a square using HTML5 SVG , fill the square with green color and make 6px brown stroke width
(ii) Write the following mathematical expression by using HTML5 MathML. d=x2-y2
(iii) Redirecting current page to another page after 5 seconds using HTML5 meta tag

4. Demonstrate the following HTML5 Semantic tags- <article>, <aside>, <details>, <figcaption>, <figure>, <footer>, <header>, <main>, <mark>, <section> for a webpage that gives information about travel experience.5.

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 40[1]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 typeAdd 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 leftAlso demonstrate list style type with user defined image logos
7.Create following web page using HTML and CSS with tabular layout**.**

8.Create following calculator interface with HTML and CSSWrite 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

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
Module-I **Python Basics**: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program, **Flow control:** Boolean Values, Comparison Operators, Boolean Operators,Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules,Ending a Program Early with sys.exit(), **Functions:** def Statements with Parameters, Return Values and return Statements,The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number	**08 Hours**
Module-II **Lists:** The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References, **Dictionaries and Structuring Data:** The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things,	**08 Hours**
Module-III **Manipulating Strings:** Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup **Reading and Writing Files:** Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module,Saving Variables with the print.format() Function, Project: Generating Random Quiz Files, Project: Multiclipboard,	**09 Hours**
Module-IV **Organizing Files:** The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File, **Debugging:** Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE s Debugger.	**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, The init 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",**1stEdition, 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:

CO1	Demonstrate proficiency in handling loops and creation of functions.
CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
CO3	Develop programs for string processing and file organization
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.

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.

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 carI have four wheels I am a vehicleWrite 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++.

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

CO1	Able to understand and design the solution to a problem using object-oriented programming concepts.
CO2	Able to reuse the code with extensible Class types, User-defined operators and function Overloading.
CO3	Achieve code reusability and extensibility by means of Inheritance and Polymorphism
CO4	Implement the features of C++ including file stream and file handling
CO5	Demonstrate exception handling in C++

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
Module-I Introduction to pointers: The & and * operator, Pointer expressions, Jargon of Pointers, passing addresses to functions, Functions returning pointers, problems. Pointers and arrays: Passing array elements to a function, Pointers and arrays, passing an entire array to a function, Pointers and 2-D arrays, pointer to an array, passing 2D array to a function. problems., File pointers, pointers to functions, argc and argv-Arguments to main( ), pointers and variable number of arguments.	**09 Hours**
Module-II Array of pointers, Dynamic Memory allocation, problems, Pointers and Strings: pointers and strings, const qualifier**,** 2D array of characters, array of pointers to strings, Limitation of array of pointers to strings. Problems. Pointers and Structures: Array of structures, structure pointers, offsets of Structure Elements. problems.	**08 Hours**
Module-III Architecture of Unix, Features of Unix, Unix Commands - PATH, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, ls-l, ls-d, file ownership, file permissions, chmod, Directory permissions, changing file ownership.	**08 Hours**
Module-IV Process basics, ps, process creation and killing, at , batch and cron commands, File Systems and Inodes, Hard link, symbolic links and ln, The Directory, umask, find, Filters- cut, paste, sort, uniq, tr, grep. System administration, administrators privileges, maintaining security, user management, startup and shutdown, managing Disk space ,Device files, cpio, tar, partitions and file systems, standard file systems and types, creating partitions and file systems, mounting and unmounting file systems.	**09 Hours**

Module - V	
Shell programming: shell's interpretive cycle, pattern matching, Escaping and Quoting, Redirection, pipes, tee, command substitution, shell variables. shell scripts-simple shell programs using read, if, test, case, expr, while ,for, set, shift.	**09 Hours**

Text Books:

1. Understanding Pointers in C, Yashwant Kanetkar, 3rd Edition, BPB Publisher
2. Unix concepts and applications, Sumitabha Das, 4th edition, Mcgraw Hill Education

Reference Books:

1. 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

List of Programs

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].

Open-Ended-Program:

10. Write a C program to declare and call a function using function pointers.

Part-B

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 massage 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
Module-I An Overview of Java: Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements, Using Blocks of Code, Lexical Issues, The Java Class Libraries, Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, A Closer Look at Literals, Variables, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays, A Few Words About Strings	**09 Hours**
Module-II Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The ? Operator, Operator Precedence, Using Parentheses, Control Statements: Java s Selection Statements, Iteration Statements, Jump Statements	**08 Hours**
Module-III Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The finalize( ) Method, A Stack Class, A Closer Look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Recursion, Introducing Access Control, Understanding static, Introducing final, Arrays Revisited	**08 Hours**
Module-IV Inheritance: Inheritance, Using super, Creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance, The Object Class.	**09 Hours**

Module - V	
Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces, Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java s Built-in Exceptions, Creating Your Own Exception Subclasses, Chained Exceptions, Using Exceptions.	**09 Hours**

LIST OF PROGRAMS

Programming Assignments

1. Write a JAVA program that prints all real solutions to the quadratic equation $ax2+bx+c=0$. Read ina, b, c and use the quadratic formula.

2. Write a JAVA program for multiplication of two arrays.

3.Demonstrate the following operations and sign extension with Java programs (i) << (ii) >> (iii) >>>

4. Write a JAVA program to sort list of elements in ascending and descending order

5. Create a JAVA class called Student with the following details as variables within it.

USN

NAME

BRANCH

PHONE

PERCENTAGE

Write a JAVA program to create n Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings.

6.Write a JAVA program demonstrating Method overloading and Constructor
 overloading.

7. Design a super class called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a JAVA program to read and display at least 3 staff objects of all three categories.

8.Demonstrate dynamic dispatch using abstract class in JAVA.

9.Create two packages P1 and P2. In package P1, create class A, class B inherited from A, class C . In package P2, create class D inherited from class A in package P1 and class E. Demonstrate working of access modifiers (private, public, protected, default) in all these classes using JAVA.

10. Write a JAVA program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero. Also demonstrate working of ArrayIndex Out Of BoundException

Course outcome (Course Skill Set)

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

CO1	To illustrate basics of JAVA programming
CO2	To demonstrate working of operators in JAVA
CO3	To create classes and objects for applications
CO4	To develop simple programs based on polymorphism and inheritance
CO5	To describe the concepts of importing packages and exception handling mechanism