



Hyderabad Karnataka Education Society's  
**POOJYA DODDAPPA APPA COLLEGE OF  
ENGINEERING**

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

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

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**SCHEME & SYLLABUS (1<sup>ST</sup> YEAR)**

**BACHELOR DEGREE IN ENGINEERING**

**ELECTRONICS AND COMMUNICATION ENGINEERING  
&  
ELECTRONICS AND INSTRUMENTATION ENGINEERING**

(With effect from 2022 Academic Year)

Out Come Based Education With  
Choice Based Credit System

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

Published By :  
**Principal**  
PDA College of Engineering Kalaburagi

Printed at:  
**HKES' Printing Press**  
Kalaburagi

## PREFACE

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

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

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

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

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

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

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

## **Vision of the Institution**

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

## **Mission of the Institution**

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

### **A. Program Outcomes**

#### **Engineering Graduates will be able to:**

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

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

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

I Semester ECE/E&IE		Chemistry Group												
Sl.No.	Course Course Code	Course Title	Teaching Dept. / PSB	Teaching Hours/Week						Examination				
				Theory	Tutorial	Practical/ Drawing	SDA		Duration in Hours	CIE MARKS	SEE MARKS	TOTAL MARKS	Credits	
							L	T						P
1.	*ASC(IC) 22MATE11	Mathematics for EEE Stream-I	Maths	3	0	2	0	0	0	03	50	50	100	04
2.	#ASC(IC) 22CHEE12	Chemistry for EEE Stream	Chemistry	3	0	2	0	0	0	03	50	50	100	04
3.	ESC 22CED13	Computer Aided Engineering Drawing	Civil/Mech Dept.	2	0	2	0	0	0	03	50	50	100	03
4.	ESC-I(IC) 22ESC145	Introduction to C Programming	Respective Engg. Dept.	2	0	2	0	0	0	03	50	50	100	03
5.	ETC 22ETC15X	Emerging Technology Courses	Any Engg. Dept.	3	0	0	0	0	0	03	50	50	100	03
6.	AEC 22ENG16	Communicative English	Humanities	1	0	0	0	0	0	1.5	50	50	100	01
7.	HSMS 22ICO17	Indian Constitution	Humanities	1	0	0	0	0	0	1.0	50	50	100	01
8.	HSMS 22SFH18	Scientific Foundation of Health	Any Department	1	0	0	0	0	0	1.5	50	50	100	01
			TOTAL								400	400	800	20

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

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

**\*-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 ),

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(WITH EFFECT FROM THE ACADEMIC YEAR 2022-23)

II Semester ECE/E&IE													Physics Group				
Sl.No.	Course Code	Course Title	Teaching Dept./ PSB	Teaching Hours/Week						Examination							
				Theory	Tutorial	Practical/ Drawing		SDA		Duration in Hours	CIE MARKS	SEE MARKS	TOTAL MARKS	Credits			
						L	T	P	S								
1.	*ASC(IC) 22MATE21	Mathematics for EEE Stream-II	Maths	3	0	2	0	0	0	03	50	50	100	04			
2.	#ASC(IC) 22PHYE22	Physics for EEE Stream	Physics	3	0	2	0	0	0	03	50	50	100	04			
3.	ESC 22BEE23	Introduction to Electronics Engineering	Respective Engg. Dept.	3	0	0	0	0	0	03	50	50	100	03			
4.	ESC-II 22ESC244	Introduction to Mechanical Engg.	Respective Engg. Dept.	3	0	0	0	0	0	03	50	50	100	03			
5.	PLC (IC) 22PLC25X	Programming Language Courses	Any Engg. Dept.	2	0	2	0	0	0	03	50	50	100	03			
6.	AEC 22PWS26	Professional Writing Skills in English	Humanities	1	0	0	0	0	0	1.5	50	50	100	01			
7.	HSMS 22KSK17/27 22KBK17/27	Samskrutika Kannada / Balake Kannada	Humanities	1	0	0	0	0	0	1.5	50	50	100	01			
8.	AEC/SDC 22IDT28	Innovation and Design Thinking	Any Department	1	0	0	0	0	0	1.5	50	50	100	01			
			TOTAL								400	400	800	20			

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

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

**\*-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 ELECTRICAL & ELECTRONICS ENGG. STREAM - I

[As per Choice Based Credit System (CBCS) scheme] - (From the academic year 2022-23)

Course Code	22MATE11	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Lecture Hours/Week (L-T-P)	3-0-2-0	Total Marks	100
Total Hours	40 Hours Theory+12 Lab Hours	SEE Hours	03

### Course Objectives:

**Familiarize** the importance of calculus associated with one variable and two variables, the importance of Integral calculus for Electrical & Electronics Engineering.

**Analyze** Electrical & Electronics Engineering problems applying Ordinary Differential Equations.

**Develop** the knowledge of Linear Algebra refereeing to matrices.

MODULES	Hours
<p style="text-align: center;"><b>Module-1 Calculus</b></p> <p>Introduction to polar coordinates and curvature relating to EC&amp;EE engineering. Polar coordinates, Polar curves, angle between the radius vector and the tangent, and angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Simple Problems. <b>Self-study:</b> Center and circle of curvature, evolutes and involutes. <b>Applications:</b> Communication signals, Manufacturing of microphones, and Image processing.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-2 Series Expansion and Multivariable Calculus</b></p> <p><b>Introduction to series expansion and partial differentiation in the field of EC&amp;EE Engineering applications.</b> Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms – L'Hospital's rule, problems. Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables – Simple Problems. <b>Self-study:</b> Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint. <b>Applications:</b> Series expansion in communication signals, Errors and approximations</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-3 Ordinary Differential Equations (ODEs) of first order</b></p> <p><b>Introduction to first-order ordinary differential equations pertaining to the applications for EC&amp;EE Engineering.</b> Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on <math>\frac{1}{N} \left( \frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right)</math> and <math>\frac{1}{M} \left( \frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right)</math> Orthogonal trajectories, L-R and C-R circuits. Problems. <b>Importance of higher-order ordinary differential equations in EC&amp;EE Engineering applications.</b></p>	<b>08 Hours</b>

<p>Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters.</p> <p><b>Self-Study:</b> Applications of ODEs in EC&amp;EE Engineering field. Cauchy's and Legendre's homogeneous differential equations - Problems.</p> <p><b>Applications of ordinary differential equations:</b> Rate of Growth or Decay</p>	
<p style="text-align: center;"><b>Module-4 Integral Calculus</b></p> <p><b>Introduction to Integral Calculus in EC&amp;EE Engineering applications.</b></p> <p><b>Multiple Integrals:</b> 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.</p> <p><b>Beta and Gamma functions:</b> Definitions, properties, relation between Beta and Gamma functions. Problems.</p> <p><b>Self-Study:</b> Volume by triple integration, Center of gravity. <b>Applications:</b> Antenna and wave propagation, Calculation of optimum power in electrical circuits, field theory</p>	<p><b>08 Hours</b></p>
<p style="text-align: center;"><b>Module-5 Linear Algebra</b></p> <p><b>Introduction of linear algebra related to EC&amp;EE Engineering applications.</b></p> <p>Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigenvectors, Rayleigh's power method to find the dominant Eigen value and Eigenvector.</p> <p><b>Self-Study:</b> Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.</p> <p><b>Applications of Linear Algebra:</b> Network Analysis, Critical point of a network system. Optimum solution.</p>	<p><b>08 Hours</b></p>
<p><b>List of Laboratory experiments (2 hours/week per batch/ batch strength 15)</b>  <b>10 lab sessions + 1 repetition class + 1 Lab Assessment</b></p>	
1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives, Jacobian and plotting the graph
4	Applications to Maxima and Minima of two variables
5	Solution of first-order differential equation and plotting the graphs / Solutions of Second-order ordinary differential equations with initial/boundaryconditions
6	Program to compute surface area, volume and centre of gravity
7	Evaluation of improper integrals
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigen values and eigenvectors and find the largest and smallest eigen value by Rayleigh power method
<p><b>Suggested software's:</b> Mathematica/MatLab/Python/Scilab</p>	

**Text book:**

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:** "Adv Engg Maths" 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.

**Semester End Examination (SEE):**

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

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

**Course outcome (Course Skill Set)**

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

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

## CHEMISTRY FOR ELECTRICAL & ELECTRONICS ENGINEERING STREAM

<b>Course Code:</b>	<b>22CHEC12/22</b>	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 Lab Hours	Credits	04

### Pre-requisite

### Course Objectives

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

### Module-1:

#### Chemistry of Polymers and Electronic Materials

**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-2: Energy Conversion and Storage

**Batteries:** Introduction, classification of batteries. Components, construction, working and applications of modern batteries; Na-ion battery, Zn-air, Ni-MH, solid state battery (Li-polymer battery) and Li-ion battery.

**Fuel Cells:** Introduction, construction, working and applications of methanol-oxygen and Polymer electrolyte membrane (PEM) fuel cell.

**Chemical Fuels:** Introduction, calorific value, determination of calorific value using bomb calorimeter, numerical problems on GCV and NCV.

**Self-learning:** Electrodes for electrostatic double layer capacitors, pseudo capacitors, and Hybrid capacitor.

**08  
Hours**

<p style="text-align: center;"><b>MODULE 3: Corrosion Science and E-waste Management</b></p> <p><b>Corrosion Chemistry:</b> Introduction, electrochemical theory of corrosion, types of corrosion-differential metal and differential aeration. Corrosion control - galvanization, anodization and sacrificial anode method. Factors affecting corrosion (EMF, Temperature, pH, relative area of anode and cathode and polarization).</p> <p><b>E-waste Management:</b> Introduction, sources, types, effects of e-waste on environment and human health, methods of disposal, advantages of recycling. Extraction of gold from E-waste.</p> <p><b>PCB:</b> Electroless plating – Introduction, Electroless plating of copper in the manufacture of PCB.</p> <p><b>Self-learning:</b> Recycling of PCB and battery components</p>	<p><b>08 Hours</b></p>
<p><b>Module-4: Water Technology and Nanotechnology</b></p> <p><b>Water technology:</b> Introduction, sources and nature of impurities of water, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by Lime-Soda Process, determination of COD, numerical problems. Purification of water by Reverse osmosis and chlorination methods.</p> <p><b>Nanotechnology:</b> Introduction, properties and engineering application of carbon nanotubes, graphene and nanomaterials for water treatment(metal oxide)</p> <p><b>Self-learning:</b> Introduction, classification, properties and application of silicon carbide.</p>	<p><b>08 Hours</b></p>
<p style="text-align: center;"><b>MODULE 5: Electrode System in Analytical Techniques</b></p> <p><b>Electrode System:</b> 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.</p> <p><b>Analytical Techniques:</b> Introduction, principle and instrumentation of Colorimetric sensors; its application in the estimation of copper, Potentiometric sensors; its application in the estimation of iron, Conductometric sensors; its application in the estimation of weak acid.</p> <p><b>Self-learning:</b> IR and UV- Visible spectroscopy.</p>	<p><b>08 Hours</b></p>

**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- 2<sup>nd</sup> Edition.
2. Engineering Chemistry, Satyaprakash& Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. Groukrishana, Vikas Publishing
7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12<sup>th</sup> Edition, 2011.
8. A Text Book of Engineering Chemistry, R.V. Gadag and Nityananda Shetty, I. K. International Publishing house. 2<sup>nd</sup> Edition, 2016.
9. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4<sup>th</sup> Edition, 1999.
10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin& A.C. Arsenault, RSC Publishing, 2005.
11. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3<sup>rd</sup> Edition, 1996.
12. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
13. OLED Display Fundamentals and Applications, TakatoshiTsumimura, Wiley–Blackwell , 2012
14. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, ElzbietaFrackowiak, Wiley-VCH; 1st edition, 2013.
15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017. Dr. H. Panda,
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. Sathiyarayanan, Niraliprakashan, 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, 4<sup>th</sup> Edition, 2021
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16<sup>th</sup> Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1<sup>st</sup> Edition, 2002.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 3<sup>rd</sup> Edition 2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2<sup>nd</sup> Edition, 2010.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah& Pushpa Iyengar., Subash Publications, 5<sup>th</sup> 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., Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co

### **PRACTICAL MODULE**

#### **A – Demonstration (any two) offline/virtual:**

- A1. Synthesis of polyurethane
- A2. Determination of strength of an acid in Pb-acid battery
- A3. Synthesis of iron oxide nanoparticles
- A4. Electroplating of copper on metallic objects

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

- B1. Conductometric estimation of acid mixture
- B2. Potentiometric estimation of FAS using  $K_2Cr_2O_7$
- B3. Determination of pKa of vinegar using pH sensor (Glass electrode)
- B4. Determination of rate of corrosion of mild steel by weight loss 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. Estimation of metal in e-waste by optical sensors
- D2. Electroless plating of Nickel on Copper
- D3. Determination of glucose by electrochemical sensors
- D4. Synthesis of polyaniline and its conductivity measurement

### **Course outcome (Course Skill Set)**

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

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



## COMPUTER AIDED ENGINEERING DRAWING

<b>Course Code</b>	<b>22 CED13/23</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	THEORY	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	42 hours theory	Credits	03

**Pre-requisite: Nil**

### Course Objectives

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**

<p style="text-align: center;"><b>Module-3</b></p> <p><b>Isometric Projections:</b> Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres. Isometric projection of combination of two simple solids.</p> <p><b>Conversion of simple isometric drawings into orthographic views.</b> Problems on applications of Isometric projections of simple objects / engineering components.</p> <p><b>Introduction to drawing views using 3D environment (For CIE only).</b></p>	<p><b>08 Hours</b></p>
<p style="text-align: center;"><b>Module-4</b></p> <p><b>Development of Lateral Surfaces of Solids:</b> Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only. Development of lateral surfaces of their frustums and truncations.</p>	<p><b>08 Hours</b></p>
<p style="text-align: center;"><b>Module-5</b></p> <p><b>Multidisciplinary Applications &amp; Practice (For CIE Only):</b> <b>Free hand Sketching;</b> True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools &amp; Furniture's etc <b>Drawing Simple Mechanisms;</b> Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart &amp; Four-wheeler carts to dimensions etc <b>Electric Wiring and lighting diagrams;</b> Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software <b>Basic Building Drawing;</b> Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges, trusses using Auto CAD or suitable software, <b>Electronics Engineering Drawings-</b> Like, Simple Electronics Circuit Drawings, practice on layers concept. <b>Graphs &amp; Charts:</b> Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or any suitable software.</p>	<p><b>08 Hours</b></p>
<p><b>Text Book</b> Text book:1) Engineering Drawing - N.D. Bhatt &amp; V.M. Panchal, 48th edition, 2005- Charotar Publishing House, Gujarat. 2) "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Premkumar Fifth edition, New Age International Publishers</p> <p><b>Reference Book</b> 1. 1) Computer Aided Engineering Drawing - S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006. 2) Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore. 3) Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production- Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005- Prentice-Hall of India Pvt. Ltd., New Delhi. 4) A Primer on Computer Aided Engineering Drawing-2006, Published by VTU, Belgaum.</p>	
<p><b>Course Outcomes</b> At the end of the course the student will be able to:</p> <p><b>CO 1.</b> Draw and communicate the objects with definite shape and dimensions <b>CO 2.</b> Recognize and Draw the shape and size of objects through different views <b>CO 3.</b> Develop the lateral surfaces of the object <b>CO 4.</b> Create a Drawing views using CAD software. <b>CO 5.</b> Identify the interdisciplinary engineering components or systems through its graphical representation.</p>	

## INTRODUCTION TO C PROGRAMMING

Course Code:	<b>22ESC145/245</b>	CIE Marks	50
Course Type (Theory/Practical /Integrated )	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	30 Hours Theory + 12 Hours Practical	Credits	03

### Course Objectives

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

MODULES	Teaching Hours
<p style="text-align: center;"><b>Module-I</b></p> <p><b>Algorithms, Flowcharts, Introduction to C:</b> Algorithms, Flowcharts, Basic Structure of C Program, Executing a "C" program, Constants, Variables and Data types.</p> <p><b>Operators and Expressions, Managing Input/ Output:</b> 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 &amp; exercises.</p>	<b>06 Hours</b>
<p style="text-align: center;"><b>Module-II</b></p> <p><b>Decision making and branching:</b> Decision Making with if statement, Simple if statement, the if else , nested if statements, the else if ladder, Switch statement, The ? : operator, Unconditional control Statements.</p> <p><b>Decision Making and Looping:</b> While statement, Do-While statement, For statement, jumps in loop. Examples &amp; exercises.</p>	<b>06 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p><b>Arrays:</b> One dimensional Array, declaration, Initialization, Two dimensional Arrays declaration, Initialization, examples and exercises.</p> <p><b>Strings:</b> Declaring and Initializing String Variables, Reading Strings from Terminal, Writing strings to Screen, Arithmetic Operations on Characters, String-handling functions, examples and exercises.</p>	<b>06 Hours</b>
<p style="text-align: center;"><b>Module -IV</b></p> <p><b>Functions and Recursion :</b> Need for User-defined Functions, A multi-function program, Elements of User-defined Functions, Definition of functions, Return value and their types, Function calls, Function declaration, Category of functions, Recursion, examples and exercises.</p>	<b>06 Hours</b>

<p><b>Structures and Unions:</b> Defining a Structures, Declaration of Structure variables, Accessing Structure Members, Structure Initialization, Copying and comparing structure variables, operations on individual members, array of structures.</p> <p><b>Unions:</b> Union, Size of Structures, bit fields , examples &amp; exercises.</p>	
<p style="text-align: center;"><b>Module-V</b></p> <p><b>Pointers:</b> Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initializing of pointer variables, accessing a variable through its pointer, Examples &amp; exercises.</p> <p><b>File Management:</b> Defining and opening a file, closing file, input, output operations on files, error handling during I/O operations. Examples &amp; exercises.</p>	<p><b>06 Hours</b></p>
<p style="text-align: center;"><b>List of Programs – 22ESC145/245</b></p> <p><b>Practice Programs:</b></p> <ol style="list-style-type: none"> <li>1. Write a C program using printf statement:       <ol style="list-style-type: none"> <li>a) Print your name and Address.</li> <li>b) Print the pattern:           <pre style="margin-left: 40px;">           +           +   +           +   +   +           +   +           +           </pre> </li> </ol> </li> <li>2. Write a C Program using Scanf statements       <ol style="list-style-type: none"> <li>a) Read int, char and float values from the keyboard and display the same.</li> </ol> </li> <li>3. Write a c program to find :       <ol style="list-style-type: none"> <li>i) Area of rectangle</li> <li>ii) Area of Square</li> <li>iii) Area of circle</li> </ol> </li> <li>4. Write a c program using if , if...else , nested if and else...if ladder.       <ol style="list-style-type: none"> <li>i) To find whether number is odd or even.</li> <li>ii) To find whether number is +ve or -ve.</li> <li>iii) To find largest of two numbers.</li> <li>iv) To find largest of three numbers.</li> </ol> </li> <li>5. Write a c program using while , do-while and for looping statement.       <ol style="list-style-type: none"> <li>i) Print 1 to 10 numbers using all the three looping statements.</li> </ol> </li> <li>6. Write a c program using arrays:       <ol style="list-style-type: none"> <li>i) Read 1 to 10 array elements and display the same.</li> <li>ii) Read float elements and display the same.</li> <li>iii) Read character and display the same.</li> </ol> </li> <li>7. Write c program using strings:       <ol style="list-style-type: none"> <li>i. Read a string from keyboard and display the same.</li> </ol> </li> </ol>	

**Programming Assignments:**

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

**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.

**Course outcome (Course Skill Set)**

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

<b>C01</b>	Develop Algorithm and flowcharts and understand the different data types and Operators in C language
<b>C02</b>	Identify and use proper decision /control constructs for solving different type of problems
<b>C03</b>	Apply arrays and Strings functions to develop programs for a given problem.
<b>C04</b>	Demonstrate the use of structures and apply modular programming concepts
<b>C05</b>	Develop C program for real world problems using pointers and file operations.

## COMMUNICATIVE ENGLISH

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

**Prerequisite:** Nil

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

1. To know about Fundamentals of Communicative English and Communication Skills in general.
2. To learn sensible writing
3. To impart basic English grammar and essentials of important language skills.
4. To enhance with English vocabulary and language proficiency for better Communication skills.
5. To learn employment communication.

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

MODULES	Teaching Hours										
<p style="text-align: center;"><b>Module-V</b></p> <p><b>Communication Skills for Employment:</b> What is a presentation – Essential Element of Presentation, Designing and delivering Presentation/Public Speaking, Effective power point presentation, Communication through telephonic, videoconference &amp; Skype. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence.</p>	<b>03 Hours</b>										
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Communication Skills by Sanjay Kumar &amp; Pushp Lata, Oxford University Press India Pvt Ltd - 2019.</li> <li>2. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.</li> <li>3. Scotofer, contemporary business communication, Biztant ra</li> <li>4. Chaturvedi P D &amp; Mukesh chaturvedi - Business communication: Concepts, cases &amp; applications- 2/e, pearson education.</li> <li>5. Essential of Business communication – Rajendra Pal and J.S Korlhall – Sultan Chand &amp; Sons, New Delhi.</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>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.</li> <li>2. English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.</li> <li>3. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978- 93-86668-45-5), 2019.</li> <li>4. A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press – 2020.</li> <li>5. Practical English Usage by Michael Swan, Oxford University Press – 2016.</li> <li>6. Business Communication – K.K. Sinha – Galgotia Publishing Company, New Delhi.</li> </ol>											
<p><b>Course outcome (Course Skill Set)</b> At the end of the course the student will be able to:</p> <table border="1" data-bbox="248 1541 1414 1858"> <tbody> <tr> <td data-bbox="248 1541 349 1640"><b>CO 1</b></td> <td data-bbox="349 1541 1414 1640">Understand and apply the Fundamentals of Communication Skills in their communication skills.</td> </tr> <tr> <td data-bbox="248 1640 349 1682"><b>CO 2</b></td> <td data-bbox="349 1640 1414 1682">Learn sensible writing</td> </tr> <tr> <td data-bbox="248 1682 349 1759"><b>CO 3</b></td> <td data-bbox="349 1682 1414 1759">To impart basic English grammar and essentials of language skills as per present requirement.</td> </tr> <tr> <td data-bbox="248 1759 349 1801"><b>CO 4</b></td> <td data-bbox="349 1759 1414 1801">Understand and use all types of English vocabulary and language proficiency</td> </tr> <tr> <td data-bbox="248 1801 349 1858"><b>CO 5</b></td> <td data-bbox="349 1801 1414 1858">Adopt the Techniques of Information Transfer through presentation.</td> </tr> </tbody> </table>		<b>CO 1</b>	Understand and apply the Fundamentals of Communication Skills in their communication skills.	<b>CO 2</b>	Learn sensible writing	<b>CO 3</b>	To impart basic English grammar and essentials of language skills as per present requirement.	<b>CO 4</b>	Understand and use all types of English vocabulary and language proficiency	<b>CO 5</b>	Adopt the Techniques of Information Transfer through presentation.
<b>CO 1</b>	Understand and apply the Fundamentals of Communication Skills in their communication skills.										
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<b>CO 4</b>	Understand and use all types of English vocabulary and language proficiency										
<b>CO 5</b>	Adopt the Techniques of Information Transfer through presentation.										

<b>INDIAN CONSTITUTION</b>			
<b>Course Code</b>	<b>22IC017/27</b>	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
<b>Prerequisite:</b> Nil			
<p><b>Course Objectives :</b>            To enable the students to obtain the basic knowledge about Indian Constitution in the following topics:-</p> <ul style="list-style-type: none"> <li>■ To know about the basic structure of Indian constitution</li> <li>■ To know the Fundamental Rights (FR's) &amp; Fundamental Duties (FD's) , And DPSP's of our constitution.</li> <li>■ To know the State Executive</li> <li>■ To know about our Union Government</li> <li>■ To Learn emergency provisions and Elections process/system of India</li> </ul>			
<b>MODULES</b>		<b>Teaching Hours</b>	
<b>Module-I</b>		<b>03 Hours</b>	
<p><b>Introduction to Indian constitution :</b> The Constituent Assembly of India. Sources and Features of the Indian Constitution. Preamble to the Constitution of India.</p>			
<b>Module-II</b>		<b>03 Hours</b>	
<p><b>Fundamental rights &amp; duties and Directive Principles of the State Policy</b>            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</p>			
<b>Module-III</b>		<b>03 Hours</b>	
<p><b>The State Executive:</b> 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</p>			
<b>Module-IV</b>		<b>03 Hours</b>	
<p><b>The Union Executive:</b> 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</p>			



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

## SCIENTIFIC FOUNDATIONS OF HEALTH

<b>Course Code</b>	<b>22SFH18/28</b>	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

<b>MODULES</b>	<b>Teaching Hours</b>
<p style="text-align: center;"><b>Module-I</b></p> <p><b>Good Health &amp; It's balance for positive mindset:</b> Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health &amp; Behavior, Health &amp; Society, Health &amp; family, Health &amp; Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.</p>	<b>03 Hours</b>
<p style="text-align: center;"><b>Module-II</b></p> <p><b>Building of healthy lifestyles for better future:</b> Developing healthy diet for good health, Food &amp; health, Nutritional guidelines for good health, Obesity &amp; overweight disorders and its management, Eating disorders, Fitness components for health, Wellness and physical function, How to avoid exercise injuries.</p>	<b>03 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p><b>Creation of Healthy and caring relationships :</b> Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.</p>	<b>03 Hours</b>

<b>Module-IV</b>	<b>03 Hours</b>										
<b>Avoiding risks and harmful habits:</b> 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.											
<b>Module-V</b>	<b>03 Hours</b>										
<b>Preventing &amp; fighting against diseases for good health:</b> How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.											
<p><b>Text book:</b></p> <ol style="list-style-type: none"> <li><b>1. "Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU- University Website.</b></li> <li><b>2. "Scientific Foundations of Health",</b> (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.</li> <li><b>3. Health Psychology - A Textbook,</b> FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.</li> </ol>											
<p><b>Reference books:</b></p> <ol style="list-style-type: none"> <li><b>1. Health Psychology</b> (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.</li> <li><b>2. HEALTH PSYCHOLOGY (Ninth Edition)</b> by SHELLEY E. TAYLOR - University of California, Los Angeles, McGraw Hill Education (India) Private Limited - Open University Press.</li> <li><b>3. SWAYAM / NPTEL/ MOOCS/ We blinks/ Internet sources/ YouTube videos</b> and other materials / notes.</li> <li><b>4. Scientific Foundations of Health (Health &amp; Wellness) - General Books</b> published for university and colleges references by popular authors and published by the reputed publisher.</li> </ol>											
<p><b>Course outcome (Course Skill Set)</b> At the end of the course the student will be able to:</p> <table border="1"> <tr> <td><b>C01</b></td> <td>To understand and analyse about Health and wellness (and its Beliefs) &amp; It's balance for positive mindset.</td> </tr> <tr> <td><b>C02</b></td> <td>Develop the healthy lifestyles for good health for their better future.</td> </tr> <tr> <td><b>C03</b></td> <td>Build a Healthy and caring relationships to meet the requirements of good/social/positive life</td> </tr> <tr> <td><b>C04</b></td> <td>To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.</td> </tr> <tr> <td><b>C05</b></td> <td>Prevent and fight against harmful diseases for good health through positive mindset.</td> </tr> </table>		<b>C01</b>	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.	<b>C02</b>	Develop the healthy lifestyles for good health for their better future.	<b>C03</b>	Build a Healthy and caring relationships to meet the requirements of good/social/positive life	<b>C04</b>	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.	<b>C05</b>	Prevent and fight against harmful diseases for good health through positive mindset.
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<b>GREEN BUILDING</b>			
<b>Course Code</b>	<b>22ETC15A/25A</b>	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
<b>Pre-Requisite: NIL</b>			
<p><b>Course objectives:</b> This course will enable students to:</p> <ul style="list-style-type: none"> <li>■ Understand the Definition, Concept &amp; Objectives of the terms cost effective construction and green building</li> <li>■ Apply cost effective techniques in construction</li> <li>■ Apply cost effective Technologies and Methods in Construction</li> <li>■ Understand the Problems due to Global Warming · State the Concept of Green Building · Understand Green Buildings</li> </ul>			
<b>MODULES</b>			<b>Hours</b>
<b>Module-I</b>			<b>09 Hours</b>
Environmental implications of buildings energy, carbon emissions, water use, waste disposal. Introduction to green building, benefits, site selection, selection of materials.			
<b>Module - II</b>			<b>09 Hours</b>
Resources, efficiency, Materials impacts increasing energy efficiency, recycling of industrial and building waste, biomass resources for building, use of renewable energy systems and impacts.			
<b>Module-III</b>			<b>08 Hours</b>
Comforts in buildings, thermal, light ventilation in buildings, heat transfer characteristics in buildings, incidence of solar energy in materials for lightening and ventilation comfort.			
<b>Module -IV</b>			<b>08 Hours</b>
Energy conservation, concepts of solar passive cooling and heating of building, low energy cooling, Case studies on residential and commercial buildings			
<b>Module-V</b>			<b>08 Hours</b>
Water conservation, Rain water harvesting: definition, types and advantages, concepts of green composite			

**Text book:**

1. K.S. Jagadish, B. U. Venkataramareddy and K. S. Nanjundarao. Alternative Building Materials and Technologies. New Age International, 2007.
2. Michael Bauer, Peter Mösele and Michael Schwarz "Green Building - Guidebook for Sustainable Architecture" Springer, 2010
3. Environmental Engineering vol-II By S.K.Gerg, Khanna publications

**Reference books:**

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

**Course outcome (Course Skill Set)**

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

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

<b>INTRODUCTION TO SOLAR PV SYSTEMS</b>			
<b>Course Code</b>	<b>22ETC15B/25B</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	THEORY	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	42 Hours Theory	Credits	03
<p><b>Prerequisite:</b> Students should have the knowledge of</p> <ol style="list-style-type: none"> <li>1. Energy Fundamentals.</li> <li>2. Renewable energy sources</li> </ol> <p><b>Course objectives.</b></p> <ul style="list-style-type: none"> <li>■ Understanding the need of energy and basics of solar radiations.</li> <li>■ Study different solar thermal energy applications.</li> <li>■ Expose to PV Industry and different PV technologies.</li> <li>■ Study Inverters and different components of PV system.</li> <li>■ Study the installation of PV systems and O&amp;M.</li> </ul>			
<b>MODULES</b>			<b>Hours</b>
<b>Module-I</b>			<b>09 Hours</b>
<p><b>Solar Resource and Radiation</b>  <b>An introduction to Energy Sources:</b> Energy consumption as a measure of Prosperity, world energy futures and energy sources and their availability. <b>Solar Resource and Radiation:</b> Solar resources, Quantifying solar radiation, The effect of the Earth's atmosphere on solar radiation, Sun geometry, Geometry for installing solar arrays.</p>			
<b>Module - II</b>			<b>09 Hours</b>
<p><b>Solar thermal energy The solar energy option – An overview of thermal applications:</b> Devices for thermal collection and storage, thermal applications and some observations.</p>			
<b>Module-III</b>			<b>08 Hours</b>
<p><b>PV Industry and Technology</b>  <b>PV Industry and Technology:</b> 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.  <b>PV Cells, Modules and Arrays:</b> Characteristics of PV cells, Graphic representations of PV cell performance, Connecting PV cells to create a module, Specification sheets, Creating a string of modules, Creating an array, Photovoltaic array performance, Irradiance, Temperature, Shading.</p>			
<b>Module -IV</b>			
<p><b>Inverters and Other System Components</b>  <b>Inverters and Other System Components:</b> Introduction, Inverters, Battery inverters, Grid-interactive inverters, Transformers, Mainstream inverter technologies,</p>			

MODULES	Hours										
<p>String inverters, Multi-string inverter, Central inverter, Modular inverters, Inverter protection systems, Self-protection, Grid protection. Balance of system equipment: System equipment excluding the PV array and inverter, Cabling, PV combiner box, Module junction box, Circuit breakers and fuses, PV main disconnects/isolators, Lightning and surge protection, System monitoring, Metering, Net metering, Gross metering. Mounting Systems: Roof mounting systems, Pitched roof mounts, Pitched roof mounts for tiled roofs, Pitched roof mounts for metal roofs Rack mounts, Direct mounts, Building-integrated systems, Ground mounting systems, Ground rack mounts, Pole mounts, Sun-tracking systems, Wind loading.</p>	08 Hours										
<p style="text-align: center;"><b>Module-V</b></p> <p><b>Installing Grid-connected PV Systems</b>  <b>Installing Grid-connected PV Systems:</b> PV array installation, DC wiring, Cabling routes and required lengths, Cable sizing, PV combiner box, System grounding/earthing, Inverter installation, Installation checklist, Interconnection with the utility grid, Required information for installation, Safety.  <b>System Commissioning:</b> Introduction, Final inspection of system installation, Testing, Commissioning, System documentation.  <b>System Operation and Maintenance:</b> System maintenance, PV array maintenance, Inverter maintenance, System integrity, Troubleshooting, Identifying the problem, Troubleshooting PV arrays, Troubleshooting underperforming systems, Troubleshooting inverters, Other common problems.</p>	08 Hours										
<p><b>Question paper pattern:</b>  Total ten questions will be asked, two from each module. The student has to answer five questions, selecting at least one from each module.</p> <p>Reference Books</p> <ol style="list-style-type: none"> <li>Chetan Singh Solanki, Solar Photovoltaic Technology And Systems - A Manual For Technicians, Trainers And Engineers, PHI Publication New Delhi- 2013 Edition.</li> <li>Geoff Stapleton Susan Neill, Grid-connected Solar Electric Systems: The Earthscan Expert Handbook for Planning, Design and Installation, Routledge; 1st edition 2021.</li> <li>Chetan Singh Solanki, Solar Photovoltaic's: Fundamentals, Technologies And Applications , PHI Publication New Delhi, 3rd Edition</li> <li>GD Rai, Non Convention Sources of Energy, Khanna Publishers, New Delhi, 5th Edition</li> <li>SP Sukhatme, JK Nayak, Solar Energy, TMH Publishing Company limited New Delhi, 3rd Edition</li> </ol> <p><b>Course outcomes: On completion of the course, the student will have the ability to</b></p> <table border="1" data-bbox="253 1640 1412 1906"> <tbody> <tr> <td data-bbox="253 1640 350 1692"><b>CO1</b></td> <td data-bbox="350 1640 1412 1692">Understand the needs of energy and discuss the solar radiation.</td> </tr> <tr> <td data-bbox="253 1692 350 1745"><b>CO2</b></td> <td data-bbox="350 1692 1412 1745">Appreciate the solar thermal energy applications.</td> </tr> <tr> <td data-bbox="253 1745 350 1797"><b>CO3</b></td> <td data-bbox="350 1745 1412 1797">Discuss the PV technology and Industry.</td> </tr> <tr> <td data-bbox="253 1797 350 1850"><b>CO4</b></td> <td data-bbox="350 1797 1412 1850">Identify the components of PV system and Inverters.</td> </tr> <tr> <td data-bbox="253 1850 350 1906"><b>CO5</b></td> <td data-bbox="350 1850 1412 1906">Understand the installation of PV system and O&amp;M of PV systems</td> </tr> </tbody> </table>		<b>CO1</b>	Understand the needs of energy and discuss the solar radiation.	<b>CO2</b>	Appreciate the solar thermal energy applications.	<b>CO3</b>	Discuss the PV technology and Industry.	<b>CO4</b>	Identify the components of PV system and Inverters.	<b>CO5</b>	Understand the installation of PV system and O&M of PV systems
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<b>CO5</b>	Understand the installation of PV system and O&M of PV systems										

## RENEWABLE ENERGY SOURCES

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

**Prerequisite:** Nil

**Course objectives:**

- To understand energy scenario, energy sources and their utilization.
- To explore society's present needs and future energy demands.
- To Study the principles of renewable energy conversion systems.
- To exposed to energy conservation methods.

MODULES	Hours
<p style="text-align: center;"><b>Module-I</b></p> <p><b>Introduction: INTRODUCTION:</b> Principles of renewable energy and there types. energy and sustainable development,– Environmental Aspects of Energy Utilization– Renewable Energy Scenario in India and around the World and Potentials – Achievements / Applications</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module - II</b></p> <p><b>SOLAR ENERGY:</b> Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors - Fundamentals of Solar Photo Voltaic Conversion – Solar PV Power Generation – Solar energy Applications</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p><b>WIND ENERGY:</b> Wind Data and Energy Estimation – Wind Energy Conversion Systems – Performance – Site Selection— Safety and Environmental Aspects. <b>BIOMASS ENERGY:</b> Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies-fixed dome and floating type; Urban waste to energy conversion. Biomass Applications.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module -IV</b></p> <p><b>Tidal Power:</b> Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, advantages and limitations. <b>Ocean Thermal Energy Conversion:</b> Principle of working, OTEC power stations in the world, advantages and disadvantage with OTEC.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-V</b></p> <p><b>Green Energy:</b> Introduction, Fuel cells: Classification of fuel cells – H<sub>2</sub>; 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. <b>Geothermal Energy.</b> Introduction-, geothermal filed and its applications. Small Hydro-power generation.</p>	<b>08 Hours</b>



**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, 2<sup>nd</sup> Edition, 1996.

**Reference Books:**

1. Principles of Energy conversion, A. W. Culp Jr., McGraw Hill, 1996
2. Non-Convention Energy Resources, Shobh Nath Singh, Pearson, 2018

**Course outcome (Course Skill Set)**

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

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

## INTRODUCTION TO INTERNET OF THINGS

<b>Course Code</b>	<b>22ETC15D/25D</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	THEORY	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	42 Hours Theory	Credits	03

**Prerequisite:** NIL

**Course objectives:**

- Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics.
- Understand the recent application domains of IoT in everyday life.
- Gain insights about the current trends of Associated IOT technologies and IOT Analytics

MODULES	Hours
<p style="text-align: center;"><b>Module-I</b></p> <p><b>Basics of Networking:</b> Introduction, Network Types, Layered network models  <b>Emergence of IoT:</b> 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</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module - II</b></p> <p><b>IoT Sensing and Actuation:</b> Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics.                      Textbook 1: Chapter 5 – 5.1 to 5.9</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p>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</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module -IV</b></p> <p>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</p>	<b>08 Hours</b>

<b>MODULES</b>	<b>Hours</b>
<b>Module-V</b> 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	<b>08 Hours</b>

**Text book:**

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, "Introduction to IoT", Cambridge University Press 2021.

**Reference:**

**Reference books:**

1. S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press.
2. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
3. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.

**Course outcome (Course Skill Set)**

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

<b>C01</b>	Describe the evolution of IoT, IoT networking components, and addressing strategies in IoT.
<b>C02</b>	Classify various sensing devices and actuator types.
<b>C03</b>	Demonstrate the processing in IoT.
<b>C04</b>	Explain Associated IOT Technologies
<b>C05</b>	Illustrate architecture of IOT Applications

## INTRODUCTION TO CYBER SECURITY

<b>Course Code</b>	<b>22ETC15E/25E</b>	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
<p style="text-align: center;"><b>Module-I</b></p> <p><b>Cybercrime:</b> 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)</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module - II</b></p> <p><b>Cyber Offenses:</b> <b>How Criminals Plan Them:</b> Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercaafe &amp; cybercrimes. <b>Botnets:</b> The fuel for cybercrime, Attack Vector. Textbook:1 Chapter 2 (2.1 to 2.7)</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p><b>Tools and Methods used in Cybercrime:</b> Introduction, Proxy Servers, Anonymizers, Phishing, Password Cracking, Key Loggers and Spyways, Virus and Worms, Trozen Horses and Backdoors, Steganography, DoS and DDOS Attacks, Attacks on Wireless networks. Textbook:1 Chapter 4 (4.1 to 4.9, 4.12)</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module -IV</b></p> <p><b>Understnading Computer Forensics:</b> 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)</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-V</b></p> <p><b>Understnading Computer Forensics:</b> 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)</p>	<b>08 Hours</b>

**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:

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

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

Course Code	22MATE21	CIE Marks	50
Credits	04	SEE Marks	50
Course Type	Integrated		
Contact Hours/Week (L-T-P)	3-0-2-0	Total Marks	100
Contact Hours of Pedagogy	40 hours Theory +12 Lab slots	Exam Hours	03

**Prerequisite:** Nil

**Course objectives:**

**Familiarize** the importance of Integral calculus and Vector calculus essential for electronics and electrical engineering.

**Analyze** electronics and electrical engineering problems by applying Partial Differential Equations.

**Develop** the knowledge of solving electronics and electrical engineering problems numerically.

MODULES	Hours
<b>Module-1 Vector Calculus</b>	
<p><b>Introduction to Vector Calculus in EC&amp;EE Engineering applications.</b></p> <p><b>Vector Differentiation:</b> Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.</p> <p><b>Vector Integration:</b> Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stoke's theorem. Problems.</p> <p><b>Self-Study:</b> Volume integral and Gauss divergence theorem.</p> <p><b>Applications:</b> Conservation of laws, Electrostatics, Analysis of streamlines and electric potentials.</p>	<b>08 Hours</b>
<b>Module-2 Vector Space and Linear Transformations</b>	
<p><b>Importance of Vector Space and Linear Transformations in the field of EC &amp; EE engineering applications.</b></p> <p><b>Vector spaces:</b> Definition and examples, subspace, linear span, Linearly independent and dependent sets, Basis and dimension.</p> <p><b>Linear transformations:</b> 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.</p> <p><b>Self-study:</b> Angles and Projections. Rotation, reflection, contraction and expansion.</p> <p><b>Applications:</b> Image processing, AI &amp; ML, Graphs and networks, computer graphics.</p>	<b>08 Hours</b>

<p style="text-align: center;"><b>Module-3 Laplace Transform</b></p> <p><b>Importance of Laplace Transform for EC &amp; EE engineering applications.</b> Existence and Uniqueness of Laplace transform (LT), transform of elementary functions, region of convergence, Properties–Linearity, Scaling, t-shift property, s-domain shift, differentiation in the s-domain, division by t, differentiation and integration in the time domain, LT of special functions-periodic functions (square wave, saw-tooth wave, triangular wave, full &amp; half wave rectifier), Heaviside Unit step function, Unit impulse function.</p> <p><b>Inverse Laplace Transforms:</b> Definition, properties, evaluation using different methods, convolution theorem (without proof), problems, and Applications to solve ordinary differential equations.</p> <p><b>Self-Study:</b> Verification of convolution theorem.</p> <p><b>Applications:</b> Signals and systems, Control systems, LR, CR &amp; LCR circuits.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-4 Numerical Methods -1</b></p> <p><b>Importance of numerical methods for discrete data in the field of EC &amp; EE engineering applications.</b> Solution of algebraic and transcendental equations: Regula-Falsi method and Newton-Raphson method (only formulae). Problems. Finite differences, Interpolation using Newton’s forward and backward difference formulae, Newton’s divided difference formula and Lagrange’s interpolation formula (All formulae without proof). Problems.</p> <p><b>Self-Study:</b> Bisection method, Lagrange’s inverse Interpolation.</p> <p><b>Applications:</b> Estimating the approximate roots, extremum values.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-5 Numerical Methods -2</b></p> <p><b>Numerical integration:</b> Trapezoidal, Simpson’s (1/3)rd and (3/8)th rules (without proof). Problems.</p> <p><b>Introduction to various numerical techniques for handling EC &amp; EE applications.</b></p> <p><b>Numerical Solution of Ordinary Differential Equations (ODEs):</b> Numerical solution of ordinary differential equations of first order and first degree – Taylor’s series method, Modified Euler’s method, Runge-Kutta method of fourth order and Milne’s predictor corrector formula (No derivations of formulae). Problems.</p> <p><b>Self-Study:</b> Adam-Bashforth method.</p> <p><b>Applications:</b> Estimating the approximate solutions of ODE for electric circuits.</p>	<b>08 Hours</b>
<p>Text book:</p> <ol style="list-style-type: none"> <li>1. <b>B. S. Grewal:</b> “Higher Engineering Mathematics”, Khanna publishers, 44th Ed., 2021.</li> <li>2. <b>E. Kreyszig:</b> “Advanced Engineering Mathematics”, John Wiley &amp; Sons, 10th Ed., 2018</li> </ol>	

**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

**Practical Module**

1. Finding gradient, divergent, curl and their geometrical interpretation
2. Computation of basis and dimension for a vector space and Graphical representation of linear transform.
- 3 Computing the inner product and orthogonality.
4. Computing Laplace transform and Inverse Laplace transform of standard functions.
5. Laplace transform of convolution of two functions.
6. Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method
7. Interpolation/Extrapolation using Newton's forward and backward difference formula
8. Computation of area under the curve using Trapezoidal, Simpson's  $(1/3)^{rd}$  and  $(3/8)^{th}$  rule
9. Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
10. Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method

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

**Course outcome (Course Skill Set)**

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

<b>C01</b>	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
<b>C02</b>	Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation
<b>C03</b>	To understand the concept of Laplace transform and to solve initial value problems.
<b>C04</b>	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
<b>C05</b>	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab



## PHYSICS FOR ELECTRICAL AND ELECTRONICS ENGINEERING STREAM

Course Code:	<b>22PHYE12/22</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated )	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 12 Hours Lab	Credits	04

**Prerequisite:**

Wave-Particle dualism, Classical Free Electron Theory, Properties of light, Electricity & Magnetism  
Basics of Semiconductors

**Course objectives.**

- To study the principles of quantum mechanics
- To understand the properties of dielectrics and superconductors
- To study the essentials of photonics for engineering applications.
- To understand fundamentals of vector calculus and EM waves.
- To study the knowledge about semiconductors and devices.

Modules	Teaching Hours
<p style="text-align: center;"><b>Module-1</b></p> <p><b>Quantum Mechanics:</b> de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus-Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation, Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Waveforms and Probabilities. Numerical Problems</p> <p><b>Pre-requisite: Wave-Particle dualism</b> <b>Self-learning: De Broglie Hypothesis</b></p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-2</b></p> <p><b>Electrical Properties of Solids:</b> <b>Conductors:</b> Quantum Free Electron Theory of Metals: Assumptions, Fermi-energy, Fermi factor, Variation of Fermi Factor with Temperature and Energy, Mention of expression for electrical conductivity. <b>Dielectric Properties:</b> Polar and non-polar dielectrics, Electrical Polarization Mechanisms, internal fields in solids, Clausius-Mossotti equation (Derivation), Solid, Liquid and Gaseous dielectrics. Application of dielectrics in transformers, Capacitors, Electrical Insulation. Numerical Problems. <b>Superconductivity:</b> Introduction to Superconductors, Temperature dependence of</p>	<b>08 Hours</b>

<p>resistivity, Meissner Effect, Critical Field, Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), High Temperature superconductivity, SQUID, MAGLEV, Numerical problems.</p> <p><b>Pre-requisites: Classical Free Electron Theory</b>  <b>Self-learning: Dielectrics Basics</b></p>	
<p style="text-align: center;"><b>Module-3</b></p> <p><b>Lasers and Optical Fibers:</b>  <b>Lasers:</b> Characteristics of LASER, Interaction of radiation with matter, Expression for Energy Density and its significance. Requisites of a Laser System. Conditions for Laser action. Principle, Construction and Working of Carbon Dioxide Laser. Application of Lasers in Defense (Laser range finder) and Laser Printing. Numerical Problems  <b>Optical Fibers:</b> Total Internal Reflection, Propagation mechanism, Angle of Acceptance, Numerical Aperture, Fractional Index Change, Modes of Propagation, Number of Modes and V Number, Types of Optical Fibers. Attenuation and Mention of Expression for Attenuation coefficient, Attenuation Spectrum of an Optical Fiber with Optical Windows. Discussion of Block Diagram of Point to Point Communication, Intensity based Fiber Optic Displacement Sensor, Merits and Demerits, Numerical problems.</p> <p><b>Pre-requisite: Properties of light</b>  <b>Self-learning: Total Internal Reflection</b></p>	<p><b>08 Hours</b></p>
<p style="text-align: center;"><b>Module - IV</b></p> <p><b>Maxwell's Equations and EM waves:</b>  <b>Maxwell's Equations:</b> Fundamentals of Vector Calculus. Divergence and Curl of Electric field and Magnetic field (static), Gauss' divergence theorem and Stoke's theorem. Description of laws of Electrostatics, Magnetism, Faraday's laws of EMI, Current Density, Equation of Continuity, Displacement Current (with derivation), Maxwell's equations in vacuum, Numerical Problems  <b>EM Waves:</b> The wave equation in differential form in free space (Derivation of the equation using Maxwell's equations), Plane Electromagnetic Waves in vacuum, their transverse nature.</p> <p><b>Pre-requisite: Electricity &amp; Magnetism</b>  <b>Self-learning: Fundamentals of vector calculus.</b></p>	<p><b>08 Hours</b></p>
<p style="text-align: center;"><b>Module - V</b></p> <p><b>Semiconductors and Devices:</b>  Fermi level in Intrinsic &amp; Extrinsic Semiconductor, Expression for concentration of electrons in conduction band &amp; holes concentration in valance band (only mention the expression), Relation between Fermi energy &amp; Energy gap in intrinsic semiconductors(derivation), Law of mass action, Electrical conductivity of a semiconductor (derivation), Hall effect, Expression for Hall coefficient (derivation) and its application. Photo-diode and Power responsivity, Construction and working of Semiconducting Laser, Four probe method to determine resistivity, Phototransistor, Numerical problems.</p> <p><b>Pre-requisite: Basics of Semiconductors</b>  <b>Self-learning: Fermi level in Intrinsic &amp; Extrinsic Semiconductor</b></p>	<p><b>08 Hours</b></p>

**TEXT BOOKS:**

1. A Textbook of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand. & Company Ltd, New Delhi.
2. An Introduction to Lasers theory and applications by M.N. Avadhanulu and P.S. Hemne revised Edition 2012. S. Chand and Company Ltd -New Delhi.
3. Engineering Physics-Gaur and Gupta-Dhanpat Rai Publications-2017.
4. Concepts of Modern Physics-Arthur Beiser: 6th Ed; Tata McGraw Hill Edu Pvt Ltd- New Delhi 2006. Fundamentals of Fibre Optics in Telecommunication & Sensor Systems, B.P. Pal, New Age International Publishers.

**REFERENCE BOOKS:**

1. Introduction to Electrodynamics, David Griffith, 4<sup>th</sup> Edition, Cambridge University Press 2017.
2. Lasers and Non Linear Optics – B.B. Laud, 3rd Ed, New Age International Publishers 2011.
3. LASERS Principles, Types and Applications by K.R. Nambiar-New Age International Publishers. Solid State Physics-S O Pillai, 8th Ed- New Age International Publishers-2018.

**PRACTICAL MODULE****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 Plank's Constant using LEDs.
10. Determination of Fermi Energy of Copper.
11. Identification of circuit elements in a Black Box and determination of values of the components.
12. Determination of Energy gap of the given Semiconductor.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Study of Application of Statistics using spread sheets
16. PHET Interactive
17. Determination of frequency of alternating current using Sonometer
18. Interference at an Air wedge

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

**Course outcome (Course Skill Set)**

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

**C01 Describe** the fundamental principles of the Quantum Mechanics and the essentials of Photonics

**C02 Elucidate** the concepts of conductors, dielectrics and superconductivity

**C03 Discuss** the fundamentals of vector calculus and their applications in Maxwell's Equations and EM Waves.

**C04 Summarize** the properties of semiconductors and the working principles of semiconductor devices.

**C05 Practice** working in groups to conduct experiments in physics and **Perform** precise and honest measurements.

## INTRODUCTION TO ELECTRONICS ENGINEERING

<b>Course Code</b>	<b>22BEE23</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	42 Hours Theory	Credits	03

**Prerequisite:** Nil

**Course objectives:**

- 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
<p style="text-align: center;"><b>Module 1</b></p> <p><b>Power Supplies:</b> Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers.</p> <p><b>Amplifiers:</b> CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module - 2</b></p> <p><b>Operational amplifiers:</b> Ideal op-amp; characteristics of ideal and practical op-amp.</p> <p><b>Practical op-amp circuits:</b> Inverting and non-inverting amplifiers, voltage follower, summer, subtractor, integrator, differentiator.</p> <p><b>Oscillators:</b> 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)</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module - 3</b></p> <p><b>Boolean Algebra and Logic Circuits:</b> Binary numbers, Number Base Conversion, octal &amp; 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</p> <p><b>Combinational logic:</b> Introduction, Design procedure, Adders- Half adder, Full adder.</p>	<b>08 Hours</b>

<p style="text-align: center;"><b>Module - 4</b></p> <p><b>Embedded Systems:</b> 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</p> <p><b>Sensors and Interfacing:</b> Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-5</b></p> <p><b>Analog Communication Schemes:</b> 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)</p> <p><b>Digital Modulation Schemes:</b> Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.</p>	<b>09 Hours</b>
<p><b>Text book:</b></p> <ol style="list-style-type: none"> <li>1. Mike Tooley, 'Electronic Circuits, Fundamentals &amp; Applications', 4th Edition, Elsevier, 2015. DOI <a href="https://doi.org/10.4324/9781315737980">https://doi.org/10.4324/9781315737980</a>. eBook ISBN9781315737980 2nd</li> <li>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</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> </ol> <p><b>Course Outcome:</b> (Course Skill Set) At the end of the course the student will be able to:</p> <p><b>CO1 :</b> Design basic power supply &amp; study concept of amplifiers.</p> <p><b>CO2 :</b> To analyze working of op-amp with its applications &amp; to study oscillators.</p> <p><b>CO3 :</b> Develop competence knowledge to construct basic digital circuit by make use of basic gate and its function.</p> <p><b>CO4 :</b> Understand the concept of embedded system. Study role of Sensor and its interfacing.</p> <p><b>CO5 :</b> To study various analog and digital modulation and demodulation techniques</p>	

## INTRODUCTION TO MECHANICAL ENGINEERING

Course Code:	<b>22ESC144/244</b>	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	Credits	03

### Course Learning Objectives

- CO 1.** Acquire a basic understanding about scope of mechanical engineering, fundamentals about steam and non- conventional energy sources.
- CO 2.** Acquire a basic knowledge about conventional and advanced manufacturing processes.
- CO 3.** Acquiring a basic understanding about IC engines, propulsive devices and air-conditioner.
- CO 4.** Acquiring a basic knowledge about power transmission and joining processes.
- CO 5.** Acquiring a basic insight into future mobility and mechatronics and robotics.

### Teaching-Learning Process

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

### Module-1

### Teaching Hours

#### Introduction to Mechanical Engineering (Overview only):

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

#### Steam Formation and Application:

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

#### Energy Sources and Power Plants:

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

**9 Hours**

### Module-2

#### Machine Tool Operations:

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

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

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

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

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

**9 Hours**

<p style="text-align: center;"><b>Module-3</b></p> <p><b>Introduction to IC Engines:</b> Components and working principles, 4-Stroke Petrol and Diesel engines, Application of IC Engines, performance of IC engines (Simple numerical).</p> <p><b>Introduction to Refrigeration and Air Conditioning:</b> Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner &amp; Applications of air Conditioners</p>	<b>8 Hours</b>
<p style="text-align: center;"><b>Module-4</b></p> <p><b>Mechanical Power Transmission:</b></p> <p><b>Gear Drives:</b> Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)</p> <p><b>Belt Drives:</b> Introduction, Types of belt drives (Flat and V-Belt Drive), length of the belt and tensions ratio (simple numerical problems)</p> <p><b>Joining Processes:</b> Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding, MIG welding and Fusion welding.</p>	<b>8 Hours</b>
<p style="text-align: center;"><b>Module-5</b></p> <p><b>Insight into future mobility technology;</b> Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.</p> <p><b>Introduction to Mechatronics and Robotics:</b> open-loop and closed-loop mechatronic systems. Joints &amp; links, Robot anatomy, Applications of Robots in material handling, processing and assembly and inspection.</p>	<b>8 Hours</b>
<p><b>Suggested Learning Resources:</b></p> <p><b>Test Books (Title of the Book/ Name of the author/ Name of the publisher/ Edition and Year)</b></p> <ol style="list-style-type: none"> <li>1. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008</li> <li>2. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, MediaPromoters and Publishers Pvt. Ltd., 2010.</li> </ol> <p><b>Reference Books</b></p> <ol style="list-style-type: none"> <li>1. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012</li> </ol>	
<p><b>Course outcome (Indicative)</b></p> <p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li><b>CO1</b> Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources</li> <li><b>CO2</b> Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.</li> <li><b>CO3</b> Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics</li> <li><b>CO4</b> Determine the condition of steam and its energy, performance parameters of IC engines, velocity ratio and power transmitted through power transmission systems.</li> <li><b>CO5</b> Explain the Working Principle of EV vehicles and concepts of Mechatronics and Robotics</li> </ul>	



<b>PROFESSIONAL WRITING SKILLS IN ENGLISH</b>			
<b>Course Code</b>	<b>22 PWS 26</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	1:0:0:0	Exam Hours	1:30Min
Total Hours of Pedagogy	15 Hours Theory	Credits	01
<p><b>Prerequisite:</b> NIL</p> <p><b>Course objectives:</b></p> <p>The course Communicative English (22PWS26) will enable the students</p> <ol style="list-style-type: none"> <li>1. To Identify the Common Errors in Writing and Speaking of English.</li> <li>2. To Learn effective writing.</li> <li>3. To read Technical proposals properly and make them to write good technical reports.</li> <li>4. To Acquire Employment communication skills.</li> <li>5. To Acquire communication skills at Workplace</li> </ol>			
<b>MODULES</b>			<b>Teaching Hours</b>
<p align="center"><b>Module-I</b></p> <p><b>Identifying Common Errors in Writing and Speaking English:</b> Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.</p>			<b>03 Hours</b>
<p align="center"><b>Module-II</b></p> <p><b>Effective Writing:</b> Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Better writing using personal Experiences – Describing a person, situation, memorable events etc.... Sentence arrangements and Corrections activities. Misplaced modifiers, Collocations, Word Order.</p>			<b>03 Hours</b>
<p align="center"><b>Module-III</b></p> <p><b>Technical Reading and Writing Practices:</b> Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing - Types of Technical Proposals, Characteristics of Technical Proposals and basic principles of technical writing. Grammar – Cloze Test and Theme Detection Exercises</p>			<b>03 Hours</b>
<p align="center"><b>Module-IV</b></p> <p><b>Professional Communication for Employment:</b> Writing different types of letters – writing for employment, joining letter, complaints &amp; follows up, Enquiries, representation etc. Writing Curriculum Vitae( CV), Official Communication – E-mail &amp; Social Media</p>			<b>03 Hours</b>

MODULES	Teaching Hours										
<p style="text-align: center;"><b>Module-V</b></p> <p><b>Professional Communication at Workplace:</b>            Group Discussion – Do and Don't in Group discussion. Debate – Do and Don't in Debate. Group Communication- Meetings, Notice, Planning Meetings, objectives, leading meetings, Minutes of meeting, press conference. Interview – candidates preparation, grooming and Just A Minute (JAM). Speaking for better communication – Speaking about yourself.</p>	<b>03 Hours</b>										
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1."Professional Writing Skills in English" published by Phillip Learning – Education (ILS), Bangalore – 2022. 2)</li> <li>2."Functional English" (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].</li> <li>3.Murphy – Effective Business Communication – Mc Graw Hill.</li> <li>4.Nageshwar Rao and Rajendra Das – Business Skills – HPH.</li> <li>5.Advance Business Communcation – Penrose, Rasberry, Myers, 5/e, cengage learning 2004.</li> <li>6.Prasad P. Communication Skills, S.K. Kataria &amp; Sons.</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1.English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.</li> <li>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.</li> <li>3.Technical Communication – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.</li> <li>4. High School English Grammar &amp; Composition by Wren and Martin, S Chandh &amp; Company Ltd – 2015.</li> <li>5.Effective Technical Communication – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private</li> <li>6.Mc Grath – Basic Mangerial Skills – New Delhi – Prentic Hall India learning pvt ltd.</li> <li>7.Business Communcation – K.K. Sinha – Galgotio Publishing Company, New Delhi.</li> <li>8.Sen, leena Communication Skills, Prentice Hall of India, New Delhi.</li> </ol>											
<p><b>Course outcome (Course Skill Set)</b>            At the end of the course the student will be able to:</p> <table border="1" data-bbox="253 1608 1409 1915"> <tbody> <tr> <td data-bbox="253 1608 347 1659"><b>CO1</b></td> <td data-bbox="347 1608 1409 1659">To understand and identify the Common Errors in Writing and Speaking.</td> </tr> <tr> <td data-bbox="253 1659 347 1709"><b>CO2</b></td> <td data-bbox="347 1659 1409 1709">To learn effective writing.</td> </tr> <tr> <td data-bbox="253 1709 347 1759"><b>CO3</b></td> <td data-bbox="347 1709 1409 1759">To read Technical proposals properly and make them to Write good technical reports.</td> </tr> <tr> <td data-bbox="253 1759 347 1810"><b>CO4</b></td> <td data-bbox="347 1759 1409 1810">Acquire Employment and Workplace communication skills.</td> </tr> <tr> <td data-bbox="253 1810 347 1915"><b>CO5</b></td> <td data-bbox="347 1810 1409 1915">Acquire communication skills at workplace</td> </tr> </tbody> </table>		<b>CO1</b>	To understand and identify the Common Errors in Writing and Speaking.	<b>CO2</b>	To learn effective writing.	<b>CO3</b>	To read Technical proposals properly and make them to Write good technical reports.	<b>CO4</b>	Acquire Employment and Workplace communication skills.	<b>CO5</b>	Acquire communication skills at workplace
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<b>CO5</b>	Acquire communication skills at workplace										

**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ**

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

**CIE : 50**

**SEE : 50**

**SEE : 1 hours 30 Minutes**

**Total : 15 Hours**

**Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:**

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

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

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

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

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

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

**ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)**

1. ದಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗದಿಂದ ಅಯ್ಯ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

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

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

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

1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
2. ಮೆಗಾನ 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:

C01	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿಸುತ್ತದೆ.
C02	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ವರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.
C03	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಿಸುತ್ತದೆ.
C04	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕ ಹೆಚ್ಚಿಸುತ್ತದೆ.
C05	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

**University Prescribed Textbook :**

**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ**

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

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

- ವಿಶೇಷ ಸೂಚನೆ : 1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.  
2. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊರತುಪಡಿಸಿದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿನ ಉಳಿದ ಪದ್ಯ & ಗದ್ಯ ಭಾಗ ಹಾಗೂ ಇತರ ಲೇಖನಗಳನ್ನು ಹೆಚ್ಚುವರಿ ಪೂರಕ ಓದಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಈ ಪಾಠಗಳಿಂದ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದಿಲ್ಲ.

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

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

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

**ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)**

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

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

**Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:**

The course (22KBK17/27) will enable the students,

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



## Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

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

### Module - 1

(03 hours of pedagogy)

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conversation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ 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 -ಸಪ್ರಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ - (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) - Predictive Forms, Locative Case

### Module - 3

(03 hours of pedagogy)

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

### Module- 4

(03 hours of pedagogy)

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

### Module - 5

(03 hours of pedagogy)

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

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

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

**Pattern of question paper**

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

## INNOVATION AND DESIGN THINKING

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

**Prerequisite:** NIL

**Course objectives:**

- To explain the concept of design thinking for product and service development
- To explain the fundamental concept of innovation and design thinking
- To discuss the methods of implementing design thinking in the real world.

<b>MODULES</b>		<b>Hours</b>
<b>Module-I</b>		<b>03 Hours</b>
<p><b>PROCESS OF DESIGN</b>  <b>Understanding Design thinking</b> Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping</p>		
<b>Teaching-Learning Process</b>	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos	
<b>Module-II</b>		<b>03 Hours</b>
<p><b>Tools for Design Thinking</b>                      Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space                      – Empathy for design – Collaboration in distributed Design</p>		
<b>Teaching-Learning Process</b>	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	
<b>Module-III</b>		<b>03 Hours</b>
<p><b>Design Thinking in IT</b> Design Thinking to Business Process modeling – Agile in Virtual collaboration environment – Scenario based Prototyping</p>		
<b>Teaching-Learning Process</b>	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
<b>Module-IV</b>		<b>03 Hours</b>
<p><b>DT For strategic innovations</b>                      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.</p>		
<b>Teaching-Learning Process</b>	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	

<b>Module-V</b>		<b>03 Hours</b>								
Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test										
<b>Teaching-Learning Process</b>	8 hours design thinking workshop from the expect and then pre- sentation by the students on the learning from the workshop									
<p><b>Text book:</b></p> <ol style="list-style-type: none"> <li>1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) Second Edition, 2013.</li> <li>2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.</li> <li>3. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011</li> <li>4. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley &amp; Sons 2013.</li> </ol>										
<p><b>Reference books:</b></p> <ol style="list-style-type: none"> <li>1. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.</li> <li>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).</li> </ol>										
<p><b>Course outcome (Course Skill Set)</b> At the end of the course the student will be able to:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 10%;"><b>CO1</b></td> <td>Appreciate various design process procedure</td> </tr> <tr> <td style="text-align: center;"><b>CO2</b></td> <td>Generate and develop design ideas through different technique</td> </tr> <tr> <td style="text-align: center;"><b>CO3</b></td> <td>Identify the significance of reverse Engineering to Understand products</td> </tr> <tr> <td style="text-align: center;"><b>CO4</b></td> <td>Draw technical drawing for design ideas</td> </tr> </table>			<b>CO1</b>	Appreciate various design process procedure	<b>CO2</b>	Generate and develop design ideas through different technique	<b>CO3</b>	Identify the significance of reverse Engineering to Understand products	<b>CO4</b>	Draw technical drawing for design ideas
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<b>CO4</b>	Draw technical drawing for design ideas									



## INTRODUCTION TO WEB PROGRAMMING

<b>Course Code</b>	<b>22PLC15A/25A</b>	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 use the syntax and semantics of HTML and XHTML I
- To develop different parts of a web page
- To understand how CSS can enhance the design of a webpage.
- To create and apply CSS styling to a webpage
- To get familiarity with the JavaScript language and understand Document Object Model handling of Java Script

MODULES	Teaching Hours
<p style="text-align: center;"><b>Module-I</b></p> <p><b>Traditional HTML and XHTML :</b> 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?</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-II</b></p> <p><b>HTML5:</b> 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 &lt;canvas&gt;, HTML5 Form Changes, Emerging Elements and Attributes to Support Web Applications</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p><b>Cascading Style Sheets (CSS) :</b> 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.</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module-IV</b></p> <p><b>Tables and CSS, Links and Images:</b> 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.</p>	<b>08 Hours</b>

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

**Course outcome (Course Skill Set)**

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

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

**List of Programs – 22ESC145/245 Programming Assignments:**

- Create an XHTML page using tags to accomplish the following:
  - A paragraph containing text "All that glitters is not gold". Bold face and italicize this text
  - Create equation:

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

- Put a background image to a page and demonstrate all attributes of background image
- Create unordered list of 5 fruits and ordered list of 3 flowers

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

<b>Department</b>	<b>Sem1</b>	<i>Subject A</i>
		<i>Subject B</i>
		<i>Subject C</i>
	<b>Sem2</b>	<i>Subject E</i>
		<i>Subject F</i>
		<i>Subject G</i>
	<b>Sem3</b>	<i>Subject H</i>
		<i>Subject I</i>
		<i>Subject J</i>

- Use HTML5 for performing following tasks:
  - Draw a square using HTML5 SVG , fill the square with green color and make 6px brown stroke width
  - Write the following mathematical expression by using HTML5 MathML.  $d=x^2-y^2$
  - Redirecting current page to another page after 5 seconds using HTML5 meta tag
- Demonstrate the following HTML5 Semantic tags- <article>, <aside>, <details>, <figcaption>, <figure>, <footer>, <header>, <main>, <mark>, <section> for a webpage that gives information about travel experience.

5. Create a class called **income**, and make it a background color of #0ff. Create a class called **expenses**, and make it a background color of #f0f. Create a class called **profit**, and make it a background color of #f00. Throughout the document, any text that mentions income, expenses, or profit, attach the appropriate class to that piece of text. Further create following line of text in the same document: ~~The current price is 50~~<sup>1</sup> and new price is 40<sup>1-6</sup>.

6. Change the tag **li** to have the following properties:

A display status of inline

A medium, double-lined, black border

No list style type Add the following properties to the style for **li**

Margin of 5px

Padding of 10px to the top, 20px to the right, 10px to the bottom, and 20px to the left Also demonstrate list style type with user defined image logos

7. Create following web page using HTML and CSS with tabular layout.



**Sign up today**

Name:

E-mail:

Password:

Confirm password:



8. Create following calculator interface with HTML and CSS Write a Java Script program that on clicking a button, displays scrolling text which moves from left to right with a small delay

9. Create a webpage containing 3 overlapping images using HTML, CSS and JS. Further when the mouse is over any image, it should be on the top and fully displayed.

#### **Suggested Learning Resources:**

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

**TextBook-1: HTML & CSS: The Complete Reference Thomas A. Powell, , Fifth Edition, Tata McGraw Hill,**

**TextBook-2: WEB PROGRAMMING with HTML5, CSS and JavaScript, John Dean, Jones & Bartlett Learning, First Edition**

#### **Course outcome (Course Skill Set)**

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

## INTRODUCTION TO PYTHON PROGRAMMING

<b>Course Code</b>	<b>22PLC15B/25B</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	INTEGRATED	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	42 Hours	Credits	03

**Prerequisite:** Nil

**Course objectives:**

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

MODULES	Teaching Hours
<p style="text-align: center;"><b>Module-I</b></p> <p><b>Python Basics:</b> 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, <b>Flow control:</b> 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 <code>sys.exit()</code>, <b>Functions:</b> <code>def</code> Statements with Parameters, Return Values and <code>return</code> Statements, The None Value, Keyword Arguments and <code>print()</code>, Local and Global Scope, The <code>global</code> Statement, Exception Handling, A Short Program: Guess the Number</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-II</b></p> <p><b>Lists:</b> 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, <b>Dictionaries and Structuring Data:</b> The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things,</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p><b>Manipulating Strings:</b> Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup <b>Reading and Writing Files:</b> Files and File Paths, The <code>os.path</code> Module, The File Reading/Writing Process, Saving Variables with the <code>shelve</code> Module, Saving Variables with the <code>print.format()</code> Function, Project: Generating Random Quiz Files, Project: Multiclipboard,</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module-IV</b></p> <p><b>Organizing Files:</b> The <code>shutil</code> Module, Walking a Directory Tree, Compressing Files with the <code>zipfile</code> Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File, <b>Debugging:</b> Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE s Debugger.</p>	<b>08 Hours</b>

<b>Module - V</b>	<b>09 Hours</b>
<p><b>Classes and objects:</b> Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying,</p> <p><b>Classes and functions:</b> Time, Pure functions, Modifiers, Prototyping versus planning,</p> <p><b>Classes and methods:</b> Object-oriented features, Printing objects, Another example, A more complicated example, Theinit method, The_str_ method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,.</p>	

**Course outcome (Course Skill Set)**

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

<b>CO1</b>	Demonstrate proficiency in handling loops and creation of functions.
<b>CO2</b>	Identify the methods to create and manipulate lists, tuples and dictionaries.
<b>CO3</b>	Develop programs for string processing and file organization
<b>CO4</b>	Develop programs for exception handling
<b>CO5</b>	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"**, 1<sup>st</sup> Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at <https://automatetheboringstuff.com/>)

(Chapters 1 to 18, except 12) for lambda functions use this link: <https://www.learnbyexample.org/python-lambda-function/>

2. Allen B. Downey, **"Think Python: How to Think Like a Computer Scientist"**, 2<sup>nd</sup> 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:

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

## INTRODUCTION TO C++ PROGRAMMING

<b>Course Code</b>	<b>22PLC15C/25C</b>	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
<p style="text-align: center;"><b>Module-I</b></p> <p>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.</p>	<b>09 Hours</b>
<p style="text-align: center;"><b>Module-II</b></p> <p>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</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-III</b></p> <p>Inheritance &amp; Polymorphism: Derived class Constructors, destructors-Types of Inheritance- Defining Derived classes, Single Inheritance, Multiple, Hierarchical Inheritance, Hybrid Inheritance.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module-IV</b></p> <p>I/O Streams: C++ Class Hierarchy- File Stream-Text File Handling- Binary File Handling during file operations.</p>	<b>08 Hours</b>
<p style="text-align: center;"><b>Module - V</b></p> <p>Exception Handling: Introduction to Exception - Benefits of Exception handling- Try and catch block Throw statement- Pre-defined exceptions in C++</p>	<b>09 Hours</b>

### Suggested Learning Resources:

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

Textbooks

1. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
- Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd , Fourth Edition 2010.

**Course outcome (Course Skill Set)**

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

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

**List of Programs – 22PLC15D/22PLC25D****Programming Assignments:**

1. Write a C++ program to sort the elements in ascending and descending order.
2. Write a C++ program to find the sum of all the natural numbers from 1 to n.
3. Write a C++ program to swap 2 values by writing a function that uses call by reference technique.
4. Write a C++ program to demonstrate function overloading for the following prototypes.  
*add(int a, int b) add(double a, double b)*
5. Create a class named Shape with a function that prints "This is a shape". Create another class named Polygon inheriting the Shape class with the same function that prints "Polygon is a shape". Create two other classes named Rectangle and Triangle having the same function which prints "Rectangle is a polygon" and "Triangle is a polygon" respectively. Again, make another class named Square having the same function which prints "Square is a rectangle". Now, try calling the function by the object of each of these classes.
6. Suppose we have three classes Vehicle, FourWheeler, and Car. The class Vehicle is the base class, the class FourWheeler is derived from it and the class Car is derived from the class FourWheeler. Class Vehicle has a method 'vehicle' that prints 'I am a vehicle', class FourWheeler has a method 'fourWheeler' that prints 'I have four wheels', and class Car has a method 'car' that prints 'I am a car'. So, as this is a multi-level inheritance; we can have access to all the other classes methods from the object of the class Car. We invoke all the methods from a Car object and print the corresponding outputs of the methods. So, if we invoke the methods in this order, car(), fourWheeler(), and vehicle(), then the output will be I am a car I have four wheels I am a vehicle. Write a C++ program to demonstrate multilevel inheritance using this.
7. Write a C++ program to create a text file, check file created or not, if created it will write some text into the file and then read the text from the file.
8. Write a C++ program to write and read time in/from binary file using fstream
9. Write a function which throws a division by zero exception and catch it in catch block. Write a C++ program to demonstrate usage of try, catch and throw to handle exception.
10. Write a C++ program function which handles array of bounds exception using C++.



## C AND UNIX PROGRAMMING

<b>Course Code</b>	<b>22PLC15D/25D</b>	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

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

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

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

**Open-Ended-Programs:**

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

**Course outcome (Course Skill Set)**

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

CO1	Apply pointers in expressions, functions and arrays.
CO2	Illustrate dynamic memory allocation, array of pointers , pointers to strings and structures.
CO3	Demonstrate architecture of unix, unix commands related to files and directories
CO4	Demonstrate lifecycle of Process, system administration and related commands.
CO5	Develop simple shell scripts and demonstrate pattern matching.

## BASICS OF JAVA PROGRAMMING

<b>Course Code</b>	<b>22PLC15E/25E</b>	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

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

<p style="text-align: center;"><b>Module - V</b></p> <p>Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces, Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java s Built-in Exceptions, Creating Your Own Exception Subclasses, Chained Exceptions, Using Exceptions.</p>	<p><b>09 Hours</b></p>
<p><b>LIST OF PROGRAMS</b></p> <p>Programming Assignments</p> <ol style="list-style-type: none"> <li>1. Write a JAVA program that prints all real solutions to the quadratic equation <math>ax^2+bx+c=0</math>. Read in a, b, c and use the quadratic formula.</li> <li>2. Write a JAVA program for multiplication of two arrays.</li> <li>3. Demonstrate the following operations and sign extension with Java programs (i) &lt;&lt; (ii) &gt;&gt; (iii) &gt;&gt;&gt;</li> <li>4. Write a JAVA program to sort list of elements in ascending and descending order</li> <li>5. Create a JAVA class called Student with the following details as variables within it. USN NAME BRANCH PHONE PERCENTAGE</li> </ol> <p>Write a JAVA program to create n Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings.</p> <ol style="list-style-type: none"> <li>6. Write a JAVA program demonstrating Method overloading and Constructor overloading.</li> <li>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.</li> <li>8. Demonstrate dynamic dispatch using abstract class in JAVA.</li> <li>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.</li> <li>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</li> </ol>	
<p><b>Course outcome (Course Skill Set)</b></p> <p>At the end of the course the student will be able to:</p>	
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