

# **Academic Program - UG**

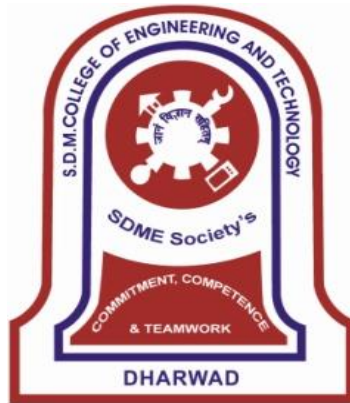
**Syllabus 2023-24**

(NEP Scheme)

## **I & II Semester B.E.**

**Stream: Computer Science & Engineering**

**Branch: Computer Science & Engineering**



**SHRI DHARMASTHALA MANJUNATHESHWARA COLLEGE OF  
ENGINEERING & TECHNOLOGY,  
DHARWAD – 580 002**

**(An Autonomous Institution approved by AICTE & Affiliated to VTU, Belagavi)**

**Ph: 0836-2447465 Fax: 0836-2464638 Web: [www.sdmcet.ac.in](http://www.sdmcet.ac.in)**

**SDM College of Engineering & Technology, Dharwad**

It is certified that the scheme and syllabus for I & II semesters of UG program in Computer Science and Engineering is recommended by Board of Studies of Computer Science and Engineering Department and approved by the Academic Council, SDM College of Engineering & Technology, Dharwad. This scheme and syllabus will be in force from the academic year 2023-24 till further revision.

Principal

Chairman BoS & HoD

**Department of Computer Science and Engineering**

**College Vision and Mission**

**Vision**

To develop competent professions with human values

**Mission**

- To have contextually relevant Curricula.
- To promote effective Teaching Learning Practices supported by Modern Educational Tools and Techniques.
- To enhance Research Culture.
- To involve the Industrial Expertise for connecting Classroom contents to real-life situations.
- To inculcate Ethics and soft-skills leading to overall personality development.

**QUALITY POLICY:**

In its quest to be a role model institution, committed to meet or exceed the utmost interest of all the stake holders.

**Core Values:**

- Competency
- Commitment
- Equity
- Team work and
- Trust

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**VISION**

To develop competent professionals in the field of Computer Science and Engineering with human values.

**MISSION**

1. To have contextually relevant curricula in line with industry trends and body of knowledge stated by IEEE/ACM.
2. To promote OBE based effective Teaching Learning Practices supported by modern educational tools and techniques.
3. To enhance research.
4. To involve the industrial expertise for connecting classroom contents to real-life situations.
5. To inculcate ethics and soft-skills leading to overall personality development.

**Program educational Objectives (PEO)**

- I. To prepare students for successful careers in Industry, Research and Institutions of higher learning
- II. To encourage students to work in teams to address industrial and socially relevant problems / projects.
- III. To provide students with a sound mathematical, scientific and engineering fundamentals necessary to formulate, analyse and solve engineering problems.
- IV. To promote student awareness and commitment to lifelong learning and professional ethics during the course of professional practice.

**PROGRAMME OUTCOMES (POs) and Programme Specific Outcomes (PSOs)**

**Program Outcomes (POs):**

- 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 modeling 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.

**Program Specific outcomes (PSOs):**

- 13. System Inception and Elaboration:** Conceptualize the software and/or hardware systems, system components and process/procedures through requirement analysis, modeling /design of the system using various architectural / design patterns, standard notations, procedures and algorithms.
- 14. System Construction:** Implement the systems, procedures and processes using the state of the art technologies, standards, tools and programming paradigms.
- 15. System Testing and Deployment:** Verify and validate the systems, procedures and processes using various testing and verification techniques and tools.
- 16. System Quality and Maintenance:** Manage the quality through various product development strategies under revision, transition and operation through maintainability, flexibility, testability, portability, reusability, interoperability, correctness, reliability, efficiency, integrity and usability to adapt the system to the changing structure and behavior of the systems /environments

## SDMCET: Syllabus

**SDM COLLEGE OF ENGINEERING AND TECHNOLOGY, DHARWAD**  
**Department of Computer Science and Engineering**  
**Stream: Computer Science and Engineering**  
**I Semester**  
**Scheme of Teaching and Examinations 2023 – 24**

SI No	Course	Course Code	Course Title	Teaching Department	Teaching Hrs/Week			Examination			Credits	
					Lecture L	Tutorial T	Practical P	Duration in Hrs	CIE Marks	SEE Marks		Total Marks
1	ASC (IC)	22MATS11	Mathematics – I for CSE Stream	BS	2	2	2	3	50	100	100	4
2	ASC (IC)	22CHES12	Chemistry for CSE Stream	BS	2	2	2	3	50	100	100	4
3	ESC	22POP13	Principles of Programming using C	CSE	2	0	2	3	50	100	100	3
4	ESC – I	22ESC142	Introduction to Electrical Engineering	EE	3	0	0	3	50	100	100	3
5	ETC – I	22ETC15I	Introduction to Cyber Security	CSE	3	0	0	3	50	100	100	3
6	AEC	22PWS16	Professional Writing Skills in English	HU	1	0	0	1	50	50	100	1
7	HSMC	22ICO17	Indian Constitution	HU	1	0	0	1	50	50	100	1
8	AEC	22SFH18	Scientific Foundations of Health	CSE	1	0	0	1	50	50	100	1
<b>Total</b>										<b>800</b>	<b>20</b>	

**ASC (IC):** Applied Science Course (Integrated Course), **AEC:** Ability Enhancement Course, **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course, **HSMS:** Humanity and Social Science and Management Course, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Examination.

Semester End Examination conducted for 100 marks will be reduced to 50 marks.

## SDMCET: Syllabus

**SDM COLLEGE OF ENGINEERING AND TECHNOLOGY, DHARWAD**  
**Department of Computer Science and Engineering**  
**Stream: Computer Science and Engineering**  
**II Semester**  
**Scheme of Teaching and Examinations 2023 – 24**

Sl No	Course	Course Code	Course Title	Teaching Department	Teaching Hrs/Week			Examination			Credits	
					Lecture	Tutorial	Practical	Duration in Hrs	CIE Marks	SEE Marks		Total Marks
					L	T	P					
1	ASC (IC)	22MATS21	Mathematics – II for CSE Stream	BS	2	2	2	3	50	100	100	4
2	ASC (IC)	22PHYS22	Physics for CSE Stream	BS	2	2	2	3	50	100	100	4
3	ESC	22CED23	Computer Aided Engineering Drawing	ME	2	0	2	3	50	100	100	3
4	ESC – II	22ESC243	Introduction to Electronics Engineering	EC	3	0	0	3	50	100	100	3
5	PLC	22PLC25E	Advanced Programming	CSE	2	0	2	3	50	100	100	3
6	AEC	22ENG26	Communicative English	HU	1	0	0	1	50	50	100	1
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada/ Balake Kannada	HU	1	0	0	1	50	50	100	1
8	SDC	22IDT28	Innovation and Design Thinking	CSE	1	0	0	1	50	50	100	1
<b>Total</b>										<b>800</b>	<b>20</b>	

**ASC (IC):** Applied Science Course (Integrated Course), **AEC:** Ability Enhancement Course, **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course, **HSMS:** Humanity and Social Science and Management Course, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Examination.  
Semester End Examination conducted for 100 marks will be reduced to 50 marks.



**I Semester**

<b>22MATS11</b>	<b>Mathematics – I for CSE Stream</b>	<b>(2-2-2) 4</b>
<b>Contact Hours: 40 Theory + 12 Lab Sessions</b>		

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

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

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Apply</b> the knowledge of calculus to solve problems related to polar curves and learn the notion of partial differentiation to compute rate of change of multivariate functions	-	-	1,2,12
<b>CO-2</b>	<b>Analyze</b> the solution of linear and nonlinear ordinary differential equations	-	-	1,2,12
<b>CO-3</b>	<b>Make</b> use of matrix theory for solving system of linear equations and <b>compute</b> eigenvalues and eigenvectors	-		1,2,12
<b>CO-4</b>	<b>Get</b> acquainted and <b>apply</b> modular arithmetic to computer algorithms.	-	-	1,2,12
<b>CO-5</b>	<b>Familiarize</b> with modern mathematical tools namely MATHEMATICA / MATLAB / PYTHON / SCILAB	-	-	1,2,12

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mapping Level	1.2	1.2	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-

**Pre-requisites:** Knowledge of fundamentals of calculus.

**Contents:**

**Unit-I**

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

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

**Applications:** Computer graphics, Image processing.

**8 Hrs**

**Unit-II**

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

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

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

**8 Hrs**

**Unit-III**

**Ordinary Differential Equations (ODE) of first Order:** Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on  $\frac{1}{N} \left( \frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right)$  and  $\frac{1}{M} \left( \frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right)$  Applications of ODEs - Orthogonal trajectories (cartesian form), LR – circuits, Problems.

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

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

**Applications of ordinary differential equations:** Rate of Growth or Decay, RC circuits.

**8 Hrs**

**Unit-IV**

**Linear Algebra:** Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigen values and Eigen vectors, Rayleigh's power method to find the dominant Eigen value and Eigen vector. Problems.

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

**Applications:** Boolean matrix, Network Analysis, Markov Analysis, Critical point of a network system. Optimum solution.

**8 Hrs**

**Unit-V**

**Modular Arithmetic:** Introduction to Congruences, Linear Congruences, The remainder theorem, Solving Polynomials, Linear Diophantine Equation, System of linear Congruences, Euler's Theorem, Wilson Theorem and Fermat's little theorem. Applications of Congruences-RSA algorithm.

**Self-Study:** Divisibility, GCD, Properties of Prime Numbers, Fundamental theorem of Arithmetic.

**Applications:** Cryptography, encoding and decoding, RSA applications in public key encryption.

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

1. 2D plots for Cartesian and polar curves
2. Finding angle between polar curves, curvature and radius of curvature of a given curve
3. Finding partial derivatives, Jacobian and plotting the graph
4. Applications to Maxima and Minima of two variables
5. Solution of first-order differential equation and plotting the graphs
6. Numerical solutions of system of linear equations, test for consistency and graphical representation.
7. Solution of system of linear equations using Gauss-Seidel iteration
8. Compute Eigen values and Eigen vectors and find the largest and smallest Eigen value by Rayleigh power method.
9. Finding GCD using Euclid's algorithm.
10. Applications of Wilson's theorem

**Suggested softwares:** Mathematica / MatLab / Python / Scilab

**Reference Books:**

- 1) B. S. Grewal, "Higher Engineering Mathematics", Khanna publishers, 44/E., 2021.
- 2) E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 10/E, 2018.
- 3) V. Ramana, "Higher Engineering Mathematics" McGraw-Hill Education, 11/E. 2017
- 4) Srimanta Pal and Subodh C. Bhunia, "Engineering Mathematics" Oxford University Press, 3/E., 2016.
- 5) N.P Bali and Manish Goyal, "A Textbook of Engineering Mathematics" Laxmi Publications, 10/E., 2022.
- 6) C. Ray Wylie and Louis C. Barrett, "Advanced Engineering Mathematics" McGraw –Hill Book Co., Newyork, 6/E., 2017.
- 7) Gupta C.B, Sing S.R and Mukesh Kumar, "Engineering Mathematics for Semester I and II", Mc-Graw Hill Education (India) Pvt. Ltd 2015.

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- 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.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs(13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Identify</b> the terms and processes involved in scientific and engineering applications.	1	-	2,3,7
<b>CO-2</b>	<b>Explain</b> the phenomena of chemistry to describe the methods of engineering processes.	1	-	2,3,7
<b>CO-3</b>	<b>Solve</b> for the problems in chemistry that are pertinent in engineering applications.	1	-	2,3,7
<b>CO-4</b>	<b>Apply</b> the basic concepts of chemistry to explain the chemical properties and processes.	1	-	2,3,7
<b>CO-5</b>	<b>Analyze</b> properties and processes associated with chemical substances in multidisciplinary situations.	1	-	2,3,7

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mapping Level	3.0	1.0	1.0	-	-	-	1.0	-	-	-	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

#### Unit-I

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

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

**Display Systems:** Liquid crystals (LC's) - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's) and Quantum Light Emitting Diodes (QLED's), Light emitting electrochemical cells.

**Self-study:** Nernst equation, Galvanic cell

**8 Hrs**

### **Unit-II**

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

**Metal Finishing:** Technological importance, Electroplating of Gold and applications, Electroless plating of Copper and its applications in PCBs.

**Self-study:** Theory of electroplating

**8 Hrs**

### **Unit-III**

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

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

**Self-study:** Regenerative fuel cells, Impact of heavy metals on environment and human health.

**8 Hrs**

### **Unit-IV**

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

**Composites:** Preparation, Properties and Applications of Carbon fibres and kevlar.

**Self-study:** Elastomers & Adhesives, Glass transition temperature

**8 Hrs**

### **Unit-V**

**Sensors:** Introduction, working principle and applications of Conductometric sensors, Electrochemical sensors and Optical sensors. Sensors for the measurement of dissolved oxygen (DO). Electrochemical sensors for the pharmaceuticals, hydrocarbons. Electrochemical gas sensors for SO<sub>x</sub> and NO<sub>x</sub>. Disposable sensors in the detection of biomolecules and pesticides.

**Energy Systems:** Introduction to batteries, construction, working and applications of

Lithium ion and Sodium ion batteries. Quantum Dot Sensitized Solar Cells (QDSSC's)- Principle, Properties and Applications.

**Self-study:** Types of electrochemical sensor, Gas sensor - O<sub>2</sub> sensor, Biosensor – Glucose sensors. **8 Hrs**

**PRACTICAL MODULE**

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

- A1. Chemical Structure drawing using software: ChemDraw or ACD/ChemSketch
- A2. Determination of strength of an acid in Pb-acid battery
- A3: Synthesis of Iron-oxide Nanoparticles
- A4. Electrolysis of water

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

- B1. Conductometric estimation of acid mixture
- B2. Potentiometric estimation of FAS using K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
- B3. Determination of pK<sub>a</sub> of vinegar using pH sensor (Glass electrode)
- B4. Determination of rate of corrosion of mild steel by weight loss method
- B5. Estimation of total hardness of water by EDTA method

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

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

**D – Open Ended Experiments (any two):**

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

**Reference Books:**

- 1) "Engineering Chemistry", Wiley India Pvt. Ltd. New Delhi, 2/E , 2013.
- 2) Satyaprakash & Manisha Agrawal, "Engineering Chemistry", Khanna Book Publishing, Delhi
- 3) Shashi Chawla, "A Text Book of Engg. Chemistry", Dhanpat Rai & Co. (P) Ltd.
- 4) Bahl & Tuli, "Essentials of Physical Chemistry", S.Chand Publishing
- 5) Sunita Rattan, Kataria "Applied Chemistry", Wiley
- 6) D. Groukrishana, "Engineering Chemistry – I", Vikas Publishing
- 7) SS Dara & Dr. SS Umare, "A Text book of Engineering Chemistry", S Chand & Company Ltd., 12/E, 2011.
- 8) R.V. Gadag and Nityananda Shetty, "A Text Book of Engineering Chemistry", I. K. International Publishing house. 2/E, 2016.
- 9) F.W. Billmeyer, "Text Book of Polymer Science", John Wiley & Sons, 4/E, 1999.
- 10) G.A. Ozin & A.C. Arsenault, "Nanotechnology A Chemical Approach to Nanomaterials", RSC Publishing, 2005.

- 11) M. G. Fontana, N. D. Greene, "Corrosion Engineering", McGraw Hill Publications, New York, 3/E, 1996.
- 12) Kirby W. Beard, "Linden's Handbook of Batteries", 5/E, McGraw Hill, 2019.
- 13) Takatoshi Tsujimura, "OLED Display Fundamentals and Applications", Wiley-Blackwell, 2012
- 14) Max Lu, Francois Beguin, Elzbieta Frackowiak, "Supercapacitors: Materials, Systems, and Applications", Wiley-VCH; 1/E, 2013.
- 15) Dr. H. Panda, "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017.
- 16) "Expanding the Vision of Sensor Materials". National Research Council 1995, Washington, DC: The National Academies Press. doi: 10.17226/4782.
- 17) Dr. Mahesh B and Dr. Roopashree B, "Engineering Chemistry", Sunstar Publisher, Bengaluru, ISBN 978-93-85155-70-3, 2022
- 18) F. H. Froes, et al, "High Performance Metallic Materials for Cost Sensitive Applications", John Wiley & Sons, 2010
- 19) Dr. K. R. Mahadik and Dr. L. Sathiyarayanan, "Instrumental Methods of Analysis", Nirali Prakashan, 2020
- 20) Douglas A. Skoog, F. James Holler, Stanley R. Crouch "Principles of Instrumental Analysis", 7/E, Cengage Learning, 2020
- 21) V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, "Polymer Science", Newage Int. Publishers, 4/E, 2021
- 22) P C Jain & Monica Jain, "Engineering Chemistry", Dhanpat Rai Publication, 16/E, 2015.
- 23) Hari Singh, Nalwa, "Nanostructured materials and nanotechnology", academic press, 1/E, 2002.
- 24) Sulabha K Kulkarni, "Nanotechnology Principles and Practices", Capital Publishing Company, 3/E, 2014
- 25) Phanikumar, "Principles of nanotechnology", Scitech publications, 2/E, 2010.
- 26) B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa Iyengar., "Chemistry for Engineering Students", Subash Publications, 5/E, 2014.
- 27) O. G. Palanna, "Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint, 2015.
- 28) Malini S, K S Anantha Raju, "Chemistry of Engineering materials", CBS publishers Pvt Ltd.,
- 29) Anupma Rajput, "Laboratory Manual Engg. Chemistry", Dhanpat Rai & Co.

**22POP13****Principles of Programming Using C****(2-0-2) 3****Contact Hours: 26 Theory + 12 Lab Sessions**

**Course Learning Objectives (CLOs):** This course focuses on the following learning results:

- Developing the problem solving skills that can be applied to problems in different areas which enables students to take-up subsequent course work and professional career.
- Provides a comprehensive study of the features of C programming language.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)/ PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Design</b> a solution by analyzing the given problem scenario and <b>represent</b> it using algorithm / flowchart.	-	1,2,3	-
<b>CO-2</b>	<b>Explain</b> the C language primitives, language principles and use them in writing simple programs.	-	1,2,3	-
<b>CO-3</b>	<b>Write</b> C programs using proper control structures to solve simple problems.	-	1,2,3	-
<b>CO-4</b>	<b>Write</b> a C program using arrays and strings to solve simple problems.	-	2,6	-
<b>CO-5</b>	<b>Explain</b> the usage and the need for writing modular programs and demonstrate its use in writing programs.	-	-	1,2,3

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	1.7	1.8	1.7	-	-	2.0	-	-	-	-	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Flow-Chart and Algorithm:** Solving various scientific, engineering and business related problems of varying complexity.

**Fundamentals of C Programming Language:** Program structure and execution. Character set, data types, operators, type conversion, expression evaluation. Input and output statements. **6 Hrs**

**Unit-II**

**Decision making and Branching:** if statement and its different forms, switch statement. **5 Hrs**

**Unit-III**

**Decision making and Looping:** loops and their behavior – entry and exit controlled loops, conditional and unconditional jump statements, Nested loops. **5 Hrs**



**Unit-IV**

**Arrays:** Single and multidimensional arrays, advantages and disadvantages of arrays, searching and sorting

**Strings:** Definition, Different ways of reading and printing strings, string handling functions, applications. **5 Hrs**

**Unit-V**

**Modular Programming:** Declaration, definition and use of functions, passing parameters to function, Recursion. **5 Hrs**

**Laboratory Component:**

**Working Platform:** Linux OperatingSystem

**Expected Coding Practices:**

1. Use of Good Programming practices: Declaration of variables, Indentation, Documentation, Simplicity of logic, Efficiency of logic, uniformity etc.
2. Generic and Reusable code.
3. Inclusions of exceptional cases.
4. Better usability

**Course Contents:**

Programming exercises of varying complexity, to meet the learning results stated in course outcomes for this course.

**Reference Books:**

- 1) E Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6/E, 2012.
- 2) Brian W Kernighan & Dennis M Ritchie, "The C programming language", Prentice-Hall India, 2/E, 2004.
- 3) R.G. Dromey., "How to solve it by Computer", Prentice-Hall India,2008
- 4) B A Forouzan and R F Gilberg, "Computer Program: A structured programming approach using C", Thomson Learning, 3/E, 2005
- 5) Brain W. Kernighan and Rob Pike, "The Practice of Programming", Pearson Education Inc.2008.

**22ESC142 Introduction to Electrical Engineering (3-0-0) 3**

**Contact Hours: 40**

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- To explain the laws used in the analysis of DC and AC circuits.
- To explain the behavior of circuit elements in single-phase circuits.
- To explain the construction and operation of transformers, DC generators and motors and induction motors.
- To introduce concepts of circuit protecting devices and earthing.
- To explain electric power generation, transmission and distribution, electricity billing, equipment and personal safety measures.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)/ PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Understand</b> the concepts of various energy sources and Electric circuits.	1	2	3, 5, 6,7,8,12
<b>CO-2</b>	<b>Apply</b> the basic Electrical laws to solve circuits.	1,2	3	4,5,6,12
<b>CO-3</b>	<b>Discuss</b> the construction and operation of various Electrical Machines.	1	2	3,4,5,6,7,8,12
<b>CO-4</b>	<b>Identify</b> suitable Electrical machine for practical implementation.	1	2,3	4,6,7,8,12
<b>CO-5</b>	<b>Explain</b> the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.	1	3,6	2,5,7,8,11,12

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	3.0	2.0	1.6	1.0	1.0	1.2	1.0	1.0	-	-	1.0	1.0	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Introduction:** Conventional and non-conventional energy resources; General structure of electrical power systems using single line diagram approach.

**Power Generation:** Hydel, Nuclear, Solar & wind power generation (Block Diagram approach).

**DC Circuits:** Ohm's Law and its limitations. KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical. **8 Hrs**

**Unit-II**

**A.C. Fundamentals:** Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions), Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical).

**Three Phase Circuits:** Generation of Three phase AC quantity, advantages and limitations; star and delta connection, relationship between line and phase quantities (excluding proof) **8 Hrs**

**Unit-III**

**DC Machines - DC Generator:** Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical.

**DC Motor:** Principle of operation, back emf and its significance. Torque equation, types of motors, characteristics and speed control (armature & field) of DC motors (series & shunt only). Applications of DC motors. Simple numerical. **8 Hrs**

**Unit-IV**

**Transformers:** Necessity of transformer, principle of operation, Types and construction of single phase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical.

**Three-phase induction Motors:** Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance, Simple numerical. **8 Hrs**

**Unit-V**

**Domestic Wiring:** Requirements, Types of wiring: casing, capping. Two way and three way control of load.

**Electricity Bill:** Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff calculation of electricity bill for domestic consumers.

**Equipment Safety measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.

**Personal safety measures:** Electric Shock, Earthing and its types, Safety Precautions to avoid shock. **8 Hrs**

**Reference Books:**

- 1) D C Kulshreshtha, “Basic Electrical Engineering”, Tata McGraw Hill, 1/E, 2019.
- 2) B.L. Theraja, “A text book of Electrical Technology”, S Chand and Company, reprint edition 2014.
- 3) D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill 4/E, 2019.
- 4) V. K. Mehta, Rohit Mehta, “Principles of Electrical Engineering & Electronics”, S. Chand and Company Publications, 2/E, 2015.
- 5) Rajendra Prasad, “Fundamentals of Electrical Engineering”, PHI, 3/E, 2014.

<b>22ETC15I</b>	<b>Introduction to Cyber Security</b>	<b>(3-0-0) 3</b>
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**Contact Hours: 40**

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- To familiarize cybercrime terminologies and perspectives.
- To understand Cyber offences and botnets.
- To gain knowledge on tools and methods used in cybercrimes
- To understand phishing and computer forensics.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Explain</b> the cybercrime terminologies.	-	1	8
<b>CO-2</b>	<b>Describe</b> Cyber offenses and Botnets.	-	1	8
<b>CO-3</b>	<b>Illustrate</b> Tools and methods used on Cybercrime.	-	5	8,14
<b>CO-4</b>	<b>Explain</b> Phishing and Identity Theft,	-	1,2	8

	encryption and decryption processes.			
<b>CO-5</b>	<b>Justify</b> the need of computer forensics.	-	1,5	8
<b>CO-6</b>	<b>Explain</b> the procedure of distribution of public and private keys.	-	1,2	8,14

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	2.0	2.0	-	-	2.0	-	-	1.0	-	-	-	-	-	1.0	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Cybercrime:** Definitions and Origins of the word, Cybercrime and Information Security, Who are cybercriminals? Classifications of cybercrimes, An Indian perspective, Hacking and Indian laws, Global perspectives. **8 Hrs**

**Unit-II**

**Cyber offenses:** Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cyber café and cybercrimes

**Botnets:** The fuel for cybercrime, attack vector. **8 Hrs**

**Unit-III**

**Tools and Methods used in Cybercrime:** Introduction, Proxy Servers, Anonymizers, Phishing, Password cracking, Key loggers and Spyways, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS attacks, Attacks on Wireless networks. **8 Hrs**

**Unit-IV**

**Phishing and Identity Theft:** Introduction, methods of phishing, phishing techniques, spear phishing

**Classical Encryption Techniques:** Introduction, Symmetric Cipher Model – Cryptography, Cryptanalysis, Substitution Techniques. **8 Hrs**

**Unit-V**

**Understanding Computer Forensics:** Introduction, Historical background of Cyber forensics, Digital Forensics Science.

**Key management and Distribution:** Introduction, Keys – Private and Public, Keys distribution – Public and Private keys. **8 Hrs**

**Reference Books:**

- 1) Sunit Belapure and Nina Godbole, “Cyber Security: Understanding Cybercrimes, Computer Forensics and Legal Perspectives”, Wiley India Pvt, Ltd, 1/E, 2011 (Reprinted 2018)
- 2) William Stallings, “Cryptography and Network Security”, 8/E, Pearson Education, 2014.

**22PWS16 Professional Writing Skills in English (1-0-0) 1**

**Contact Hours: 15**

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- To Identify the Common Errors in Writing and Speaking of English.
- To achieve better Technical writing and Presentation skills for employment.
- To read Technical proposals properly and make them to write good technical reports.
- To acquire Employment and Workplace communication skills.
- To learn about Techniques of Information Transfer through presentation in different level.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Identify</b> the Common Errors in Writing and Speaking.	-	10	-
<b>CO-2</b>	<b>Achieve</b> better Technical writing and Presentation skills.	-	10	-
<b>CO-3</b>	<b>Read</b> Technical proposals properly and <b>write</b> good technical reports.	10	-	-
<b>CO-4</b>	<b>Acquire</b> Employment and Workplace communication skills.	-	10	-
<b>CO-5</b>	<b>Learn</b> effective presentation skills.	10	-	-

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mapping Level	-	-	-	-	-	-	-	-	-	2.4	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Identifying Common Errors in Writing and Speaking English:** Verb phrase and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Words Confused/Misused. **3 Hrs**

**Unit-II**

**Nature and Style of sensible writing:** Punctuation marks, Paragraph writing, Writing articles, Precise writing and Techniques in Essay writing, Sentence arrangements and Correction activities, Misplaced modifiers, Contractions, Collocations, Correction of Errors. **3 Hrs**

**Unit-III**

**Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error & Sentence Improvement, Cloze Test and Theme Detection Exercises. **3 Hrs**

**Unit-IV**

**Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. TED talks, Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos. **3 Hrs**

**Unit-V**

**Professional Communication at Workplace:** Agenda, Minutes of Meeting, Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and its importance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills. **3 Hrs**

**Reference Books:**

- 1) "Professional Writing Skills in English" published by Phillip Learning – Education (ILS), Bangalore – 2022.

- 2) “Functional English” (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].
- 3) N.P.Sudharshana and C.Savitha, “English for Engineers”, Cambridge University Press – 2018.
- 4) Gajendra Singh Chauhan et al, “Technical Communication”, Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
- 5) Meenakshi Raman and Sangeetha Sharma, “Technical Communication – Principles and Practice”, Oxford University Press, 3/E, 2017.
- 6) Wren and Martin, “High School English Grammar & Composition”, S Chandh & Company Ltd – 2015.
- 7) M Ashraf Rizvi, “Effective Technical Communication”, McGraw Hill Education (India) Private, 2/E.
- 8) Rogers. C, Farson R.E., “Active Listening”, Gardon Training Inc
- 9) Wood, Frederick, “A Remedial English Grammar for Foreign Students”, Macmillan Education, India, 1990.
- 10) Yadugiri. M.A., “Making Sense of English – A Textbook of Sounds, Words, and Grammar”, Viva Books, 2020.

<b>22ICO17</b>	<b>Indian Constitution</b>	<b>(1-0-0) 1</b>
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**Contact Hours: 15**

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

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

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	Analyze the basic structure of Indian Constitution.	-	2	-
<b>CO-2</b>	Remember their Fundamental Rights, DPSP’s and Fundamental Duties (FD’s) of our constitution.	-	1	-



<b>CO-3</b>	<b>Know</b> about our Union Government, political structure & codes, procedures.	-	1	-
<b>CO-4</b>	<b>Understand</b> our State Executive & Elections system of India.	-	1	-
<b>CO-5</b>	<b>Remember</b> the Amendments and Emergency Provisions, other important provisions given by the constitution.	-	1	-

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	2.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Introduction:** Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly. **3 Hrs**

**Unit-II**

**Salient features of India Constitution:** Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. **3 Hrs**

**Unit-III**

**Directive Principles of State Policy (DPSP's) and its present relevance in Indian society:** Fundamental Duties and its Scope and significance in Nation, Union Executive, Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet. **3 Hrs**

**Unit-IV**

**Parliament:** LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India, Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism. **3 Hrs**

**Unit-V**

**State Executive and Governor, CM, State Cabinet, Legislature:** VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions. **3 Hrs**

**Reference Books:**

- 1) "Constitution of India" (for Competitive Exams), Naidhruva Edutech Learning Solutions, Bengaluru, 2022.
- 2) Durga Das Basu, "Introduction to the Constitution of India", (Students Edition.), Prentice –Hall, 2008.
- 3) Shubham Singles, Charles E. Haries, and et al, "Constitution of India, Professional Ethics and Human Rights", Cengage Learning India, Latest Edition, 2019.
- 4) Merunandan K B, "The Constitution of India", Merugu Publication, 2/E, Bengaluru.
- 5) Justice HN Nagamohan Dhas, "SamvidhanaOdu" - for Students & Youths, Sahayana, kerekon.
- 6) M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "Engineering Ethics", Prentice –Hall, 2004.

<b>22SFH18</b>	<b>Scientific Foundations of Health</b>	<b>(1-0-0) 1</b>
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**Contact Hours: 15**

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

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

**Course Outcomes (COs):**

<b>Description of the Course Outcome:</b> At the end of the course the student will be able to:		<b>Mapping to POs(1-12) / PSOs (13-16)</b>		
		<b>Substantial Level (3)</b>	<b>Moderate Level (2)</b>	<b>Slight Level (1)</b>
<b>CO-1</b>	<b>Explain</b> and <b>analyze</b> about Health and wellness (and its Beliefs) & its balance for positive mindset.	-	1,2	-
<b>CO-2</b>	<b>Develop</b> the healthy lifestyles for good health for their better future.	-	1,2	-

<b>CO-3</b>	<b>Build</b> a Healthy and caring relationships to meet the requirements of good/social/positive life.	-	1,2	-
<b>CO-4</b>	<b>Learn</b> about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.	-	1,2	-
<b>CO-5</b>	<b>Prevent</b> and <b>fight</b> against harmful diseases for good health through positive mindset.	-	1,2	-

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	2.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

#### **Unit-I**

**Good Health & Its balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health. **3 Hrs**

#### **Unit-II**

**Building of healthy lifestyles for better future:**Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components for health, Wellness and physical function, How to avoid exercise injuries. **3 Hrs**

#### **Unit-III**

**Creation of Healthy and caring relationships:**Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviors through social engineering. **3 Hrs**

#### **Unit-IV**

**Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictive people and non-addictive people & their behaviors. Effects of addictions, how to recovery from

addictions.

**3 Hrs**

**Unit-V**

**Preventing & fighting against diseases for good health:**How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.

**3 Hrs**

**Reference Books:**

- 1) Dr. L Thimmesha, "Scientific Foundations of Health", Published in VTU - University Website.
- 2) "Scientific Foundations of Health", Infinite Learning Solutions Publishers, Bangalore, 2022.
- 3) Jane Ogden, "Health Psychology - A Textbook", McGraw Hill Education (India) Private Limited - Open University Press, 4/E.
- 4) Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor, "Health Psychology", Routledge Publishers, 2/E.
- 5) Shelley E. Taylor, "Health Psychology" McGraw Hill Education (India) Private Limited - Open University Press, 9/E.
- 6) SWAYAM / NPTEL/ MOOCS/ Web links/ Internet sources/ YouTube videos and other materials / notes.

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

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

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Apply</b> the knowledge of numerical methods in analysing the discrete data and solving the physical and engineering problems.	-	-	1,2,12
<b>CO-2</b>	<b>Apply</b> the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing area and volume.	-	-	1,2,12
<b>CO-3</b>	<b>Understand</b> the applications of vector calculus refer to solenoidal, and irrotational vectors, Orthogonal curvilinear coordinates.	-	-	1,2,12
<b>CO-4</b>	<b>Demonstrate</b> the idea of Linear dependence and independence of sets in the vector space, and linear transformation	-	-	1,2,12
<b>CO-5</b>	<b>Get</b> familiarize with modern mathematical tools namely MATHEMATICA / MATLAB / PYTHON / SCILAB	-	-	1,2,12

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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<b>Mapping Level</b>	1.0	1.0	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-
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**Pre-requisites:** Knowledge of fundamentals of calculus.

**Course Contents:**

**Unit I**

**Numerical methods:** Solution of algebraic and transcendental equations - Regula-Falsi and Newton-Raphson methods (only formulae). Problems. Finite differences, Interpolation using Newton's forward and backward difference formulae, Newtons divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.

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

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

**Applications:** Estimating the approximate roots, extremum values, Area, volume, and surface area. Errors in finite precision.

**8 Hrs**

**Unit II**

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

**Self-Study:** Adam-Bashforth method.

**Applications:** Estimating the approximate solutions of ODE.

**8 Hrs**

**Unit III**

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

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

**Self-Study:** Center of gravity, Duplication formula.

**Applications:** Antenna and wave propagation, Calculation of optimum value in various geometries. Analysis of probabilistic models.

**8 Hrs**

**Unit IV**

**Introduction to Vector Calculus in Computer Science & Engineering:** Scalar and vector fields. Gradient, directional derivative, curl and divergence – physical interpretation, solenoidal and irrotational vector fields. Problems.

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

**Self-Study:** Volume integral.

**Applications:** Conservation of laws, Electrostatics, Analysis of streamlines.

**8 Hrs**

### Unit V

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

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

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

**Applications:** Image processing, AI & ML, Graphs and networks, computer graphics.

**8 Hrs**

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

**10 lab sessions + 1 repetition class + 1 Lab Assessment**

- 1 Solution of algebraic and transcendental equations by Ramanujan's, Regula-Falsi and Newton-Raphson method
- 2 Interpolation/Extrapolation using Newton's forward and backward difference formula
- 3 Computation of area under the curve using Trapezoidal, Simpson's (1/3)rd and (3/8)th rule
- 4 Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
- 5 Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method.
- 6 Program to compute area, surface area, volume and centre of gravity
- 7 Evaluation of improper integrals
- 8 Finding gradient, divergent, curl and their geometrical interpretation
- 9 Computation of basis and dimension for a vector space and Graphical representation of linear transformation
- 10 Computing the inner product and orthogonality

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

**Reference Books:**

- 1) B. S. Grewal, "Higher Engineering Mathematics", Khanna publishers, 44/E., 2021.
- 2) E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 10/E, 2018.
- 3) V. Ramana, "Higher Engineering Mathematics" McGraw-Hill Education, 11/E. 2017
- 4) Srimanta Pal & Subodh C. Bhunia, "Engineering Mathematics" Oxford University Press, 3/E, 2016.
- 5) N.P Bali and Manish Goyal, "A textbook of Engineering Mathematics" Laxmi Publications, 10/E, 2022.
- 6) C. Ray Wylie, Louis C. Barrett, "Advanced Engineering Mathematics" McGraw –Hill Book Co., Newyork, 6/E, 2017.
- 7) Gupta C.B, Sing S.R and Mukesh Kumar, "Engineering Mathematics for Semester I and II", Mc-Graw Hill Education (India) Pvt. Ltd 2015.
- 8) H. K. Dass and Er. Rajnish Verma, "Higher Engineering Mathematics" S. Chand Publication, 3/E, 2014.
- 9) James Stewart: "Calculus" Cengage Publications, 7/E, 2019.
- 10) David C Lay: "Linear Algebra and its Applications", Pearson Publishers, 4/E, 2018.
- 11) Gareth Williams, "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6/E, 2017.
- 12) William Stallings, "Cryptography and Network Security" Pearson Prentice Hall, 6/E, 2013.
- 13) David M Burton, "Elementary Number Theory" Mc Graw Hill, 7/E, 2010.

**22PHYS22**

**Physics for CSE Stream**

**(2-2-2) 4**

**Contact Hours: 40 Theory + 12 Lab Sessions**

**Course Learning Objectives (CLOs):** The course is designed to deliver optimum knowledge of materials and energy concepts. Content explores the fundamental theories, experimental demonstrations and their applications in various engineering fields. Scope of the curriculum includes the study of special theory of laser, optical fiber, quantum mechanics and quantum computing, electrical properties and physics for computational aspects like design and data analysis.



**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Describe</b> the principles of LASERS and Optical fibers and their relevant applications.	2	1	-
<b>CO-2</b>	<b>Discuss</b> the basic principles of Quantum Mechanics and their application in Quantum Computing.	1	2	-
<b>CO-3</b>	<b>Summarize</b> the essential properties of superconductors.	1	2	-
<b>CO-4</b>	<b>Introduction</b> of Qubit and Pauli's gates in Quantum Computing.	1	2	-
<b>CO-5</b>	<b>Illustrate</b> the application of physics in smart sensing technology.	1	-	-
<b>CO-6</b>	<b>Practice</b> working in groups to conduct experiments in physics and <b>perform</b> precise and honest measurements.	1,8,9	2,5,12	3

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	2.8	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**LASER:** Basic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients, Laser Action, Population Inversion, Metastable State, Requisites of a laser system, Semiconductor Diode Laser, Applications: Bar code scanner, Laser Printer, Laser Cooling. Numerical problems.

**Optical Fiber:** Principle and structure, Acceptance angle and Numerical Aperture (NA) and derivation of Expression for NA, Classification of Optical Fibers, Attenuation and Fiber Losses, Applications: Fiber Optic networking, Fiber Optic Communication. Numerical Problems. **8 Hrs**

**Unit-II**

**Quantum Mechanics:** de Broglie Hypothesis and Matter Waves, de Broglie

wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Nonexistence of electron inside the nucleus-Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrodinger 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. **8 Hrs**

### Unit-III

#### **Quantum Computing:**

**Wave Function in Ket Notation:** Matrix form of wave function, Identity Operator, Determination of  $|0\rangle$  and  $|1\rangle$ , Pauli Matrices and its operations on 0 and 1 states, Mention of Conjugate and Transpose, Unitary Matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product), Probability, Orthogonality

**Principles of Quantum Information & Quantum Computing:** Introduction to Quantum Computing, Moore's law & its end. Single particle quantum interference, Classical & quantum information comparison. Differences between classical & quantum computing, quantum superposition and the concept of qubit.

**Properties of a qubit:** Mathematical representation. Summation of probabilities, Representation of qubit by Bloch sphere

#### **Quantum Gates:**

Single Qubit Gates: Quantum Not Gate, Pauli -Z Gate Hadamard Gate, Pauli Matrices, Phase Gate (or S Gate), T Gate

Multiple Qubit Gates: Controlled gate, CNOT Gate, (Discussion for 4 different input states). Representation of Swap gate, Controlled-Z gate, Toffoli gate, Accounting for the extra-ordinary capability of quantum computing, Model Realizations. **8 Hrs**

### Unit-IV

**Electrical Properties of Materials and Applications:** Electrical conductivity in metals, Resistivity and Mobility, Concept of Phonon, Matthiessen's rule. Introduction to Super Conductors, Temperature dependence of resistivity, Meissner's Effect, Silsbee Effect, Types of Superconductors, Temperature dependence of critical field, BCS theory (Qualitative), Quantum Tunneling, High Temperature superconductivity, Josephson Junction, DC and AC SQUIDS (Qualitative), Applications in Quantum Computing (Mention). Numerical problems. **8 Hrs**

### Unit-V

#### **Applications of Physics in computing:**

**Physics of Animation:** Taxonomy of physics-based animation methods, Frames, Frames per Second, Size and Scale, weight and strength, Motion and Timing in Animations, Constant Force and Acceleration, The Odd rule, Motion Graphs, Numerical Calculations based on Odd Rule, Examples of Character Animation:

Jumping, Walking. Numerical problems.

**Statistical Physics for Computing:** Descriptive statistics and inferential statistics, Poisson distribution and Normal Distributions (Bell Curves), Monte Carlo Method. Numerical problems. **8 Hrs**

**Laboratory Component:**

Any Ten Experiments have to be completed from the following 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 Resistor.
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 and Parallel LCR circuits.
9. Determination of Plank's constant using LEDs.
10. Determination of Fermin 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 Statistic using Spread Sheets
16. PHET Interactive Simulations.

**Reference Books:**

- 1) S O Pillai, "Solid State Physics", New Age International Private Limited, 8/E, 2018.
- 2) Gupta and Gour, "Engineering Physics", Dhanpat Rai Publications, 2016 (Reprint).
- 3) S P Basavaraj, "Engineering Physics", 2005 Edition.
- 4) Michele Bousquet and Alejandro Garcia, "Physics for Animators", CRC Press, Taylor & Francis, 2016.
- 5) Vishal Sahani, "Quantum Computing", McGraw Hill Education, 2007 Edition.

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- To understand the basic principles and conventions of engineering drawing
- To use drawing as a communication mode
- To generate pictorial views using CAD software
- To understand the development of surfaces
- To visualize engineering components

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	Draw and communicate the objects with definite shape and dimensions	1,5,10	2,12	6,8,9
<b>CO-2</b>	Recognize and Draw the shape and size of objects through different views	1,5,10	2,12	6,8,9
<b>CO-3</b>	Develop the lateral surfaces of the object	1,5,10	2,12	6,8,9
<b>CO-4</b>	Create a Drawing views using CAD software	1,2,5,10	-	6,7,9,12
<b>CO-5</b>	Identify the interdisciplinary engineering components or systems through its graphical representation.	1,5,10	2,12	9

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	3.0	2.6	-	-	3.0	1.0	1.0	1.0	1.0	3.0	-	1.7	-	-	-	-

**Prerequisites:** None

**Course Contents:**

**Unit-I**

**Introduction:** 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. **5 Hrs**

**Unit-II**

**Orthographic Projection of Solids:** Orthographic projection of right regular solids (Solids Resting on HP only): Prisms & Pyramids (triangle, square, rectangle, pentagon, hexagon), Cylinders, Cones, Cubes & Tetrahedron. Projections of Frustum of cone and pyramids. **5 Hrs**

**Unit-III**

**Isometric Projections:** Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres. Isometric projection of combination of two simple solids. Conversion of simple isometric drawings into orthographic views. Problems on applications of Isometric projections of simple objects / engineering components. Introduction to drawing views using 3D environment. **5 Hrs**

**Unit-IV**

**Development of Lateral Surfaces of Solids:** Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only. Development of lateral surfaces of their frustums and truncations. Problems on applications of development of lateral surfaces like funnels and trays. Problems on applications of development of lateral surfaces of transition pieces connecting circular duct and rectangular duct. **5 Hrs**

**Unit-V**

**Multidisciplinary Applications & Practice:**

**Free hand Sketching:** True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc

**Drawing Simple Mechanisms:** Bicycles, Tricycles, Gear trains, Ratchets, two-

wheeler cart & Four-wheeler carts to dimensions etc

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

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

**Electronics Engineering Drawings:** Simple Electronics Circuit Drawings, practice on layers concept.

**Graphs & Charts:** Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or any suitable software. **6 Hrs**

**Reference Books:**

- 1) S.N. Lal, & T Madhusudhan:, Engineering Visulisation, 1st Edition, Cengage,Publication Parthasarathy N. S., Vela Murali, Engineering Drawing, Oxford University Press, 2015.
- 2) Bhattacharya S. K., Electrical Engineering Drawing, New Age International publishers, second edition 1998, reprint 2005.
- 3) Chris Schroder, Printed Circuit Board Design using AutoCAD, Newnes, 1997.
- 4) K S Sai Ram Design of steel structures, , Third Edition by Pearson
- 5) Nainan p kurian Design of foundation systems, Narosa publications
- 6) A S Pabla, Electrical power distribution, 6th edition, Tata Mcgraw hill
- 7) Bhatt, N.D., Engineering Drawing: Plane and Solid Geometry, 53rd edition, Charotar Publishing House Pvt. Limited, 2019.
- 8) K. R. Gopalakrishna, & Sudhir Gopalakrishna: Textbook Of Computer Aided Engineering Drawing, 39th Edition, Subash Stores, Bangalore, 2017

**22ESC243      Introduction to Electronics Engineering      (3-0-0) 3**

**Contact Hours: 40**

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- 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.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Develop</b> the basic knowledge on construction and operation of rectifiers and amplifiers.	-	3	1
<b>CO-2</b>	<b>Apply</b> the acquired knowledge to construct small scale circuits consisting of oscillators and operational amplifiers.	-	1	-
<b>CO-3</b>	<b>Develop</b> the competence knowledge to construct basic digital circuit by making use of basic gates and its function.	-	1	3
<b>CO-4</b>	<b>Apply</b> the acquired knowledge to construct small scale embedded circuits.	-	1	12
<b>CO-5</b>	<b>Study</b> the conceptual blocks of basic communication system and <b>acquire</b> the knowledge of analog and digital communication schemes.	-	1	12

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	1.8	-	1.5	-	-	-	-	-	-	-	-	1.0	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Power Supplies:** Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers.

**Amplifiers:** CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes. **8 Hrs**

**Unit-II**

**Oscillators:** Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder

network oscillator, Wein bridge oscillator, Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)

**Operational amplifiers:** Ideal op-amp; characteristics of ideal and practical op-amp; Practical opamp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, subtractor, integrator, differentiator. **8 Hrs**

### **Unit-III**

**Boolean Algebra and Logic Circuits:** Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates

**Combinational logic:** Introduction, Design procedure, Adders- Half adder, Full adder **8 Hrs**

### **Unit-IV**

**Embedded Systems:** Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC

**Sensors and Interfacing:** Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display. **8 Hrs**

### **Unit-V**

**Analog Communication Schemes:** Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky)

**Digital Modulation Schemes:** Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques. **8 Hrs**

### **Reference Books:**

- 1) Mike Tooley, "Electronic Circuits, Fundamentals & Applications", 4/E, Elsevier, 2015.
- 2) Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008
- 3) D P Kothari, I J Nagrath, 'Basic Electronics', 2/E, McGraw Hill Education (India), Private Limited, 2018.



**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- Explore user-defined data structures like structures and pointers in implementing solutions to problems.
- Selection of appropriate data structures for solving a given problem.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Explain</b> the usage and the need for writing programs using structures, unions and pointers.	-	1,2,3	-
<b>CO-2</b>	<b>Solve</b> real time problems using concepts of dynamic memory allocation and storage classes.	-	1,2,3	-
<b>CO-3</b>	<b>Construct</b> Programming solutions using user defined functions and files for storage.	-	1,2,3	-
<b>CO-4</b>	<b>Demonstrate</b> sorting and searching algorithms.	-	1,2,3	-
<b>CO-5</b>	<b>Select</b> appropriate programming constructs and data structures to build solutions to variety of problems.	-	1,2,3	12,14

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	2.0	2.0	2.0	-	-	-	-	-	-	-	-	1.0	-	1.0	-	-

**Pre-requisites:** Knowledge of fundamental Principles of Programming.

**Contents:**

**Unit-I**

**Pointers:** Introduction, Understanding Pointers, Accessing the address of a variable, Declaration and Initialization of Pointers, Accessing a variable through its pointer, Chain of pointers, Pointer expressions, Pointer Increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers as Function arguments, Functions returning pointers.

**6 Hrs**

**Unit-II**

**Structures and Unions:** Introduction, Defining a Structure, Declaring structure variables, Accessing structure members, structure initialization, copying and comparing structure variables, Operations on Individual Members, Arrays of structures, Arrays within structures, Structures within structures, Structures and Functions, Self-referential structures, Unions. **5 Hrs**

**Unit-III**

**Storage Classes:** Storage class specifiers, Local variable storage class: auto, register, and static. Global variable storage class: default global variable, extern, and static.

**Dynamic Memory allocation:** Motivation for dynamic memory requirement, Allocating a block of memory – malloc, allocating multiple blocks of memory – calloc, Releasing the used memory – free, Altering the size of a block – realloc. **5 Hrs**

**Unit-IV**

**File Handling:** Introduction, Defining an opening a file, Closing a file, Input and Output Operations on Files, Error Handling during IO operations, Random Access to Files, Command line arguments. **5 Hrs**

**Unit-V**

**Sorting:** Introduction, Bubble Sort, Selection Sort, Insertion Sort.

**Searching:** Introduction, Linear Search, Binary Search. **5 Hrs**

**Reference Books:**

- 1) E Balagurusamy, "Programming in ANSI C", 6<sup>th</sup> Edition, Tata McGraw Hill, 2012.
- 2) Yashavant Kanetkar, "Understanding Pointers in C and C++", 5/E, BPB Publications, 2019.
- 3) Reema Thareja, "Computer fundamentals and Programming in C", Oxford University, 2/E, 2017.
- 4) B A Forouzan and R F Gilberg, "Computer Program: A structured programming approach using C", 3/E, Thomson Learning, 2005
- 5) Brain W. Kernighan and Rob Pike, "The Practice of Programming", Pearson Education Inc. 2008.

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

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

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Apply</b> the Fundamentals of Communication Skills in their communication skills.	-	10	-
<b>CO-2</b>	<b>Identify</b> the nuances of phonetics, intonation and <b>enhance</b> pronunciation skills.	-	10	-
<b>CO-3</b>	<b>Impart</b> basic English grammar and essentials of language skills as per present requirement.	10	-	-
<b>CO-4</b>	<b>Acquire</b> vocabulary and language proficiency.	-	10	-
<b>CO-5</b>	<b>Adopt</b> the Techniques of Information Transfer through presentation.	10	-	-

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	-	-	-	-	-	-	-	-	-	2.4	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Introduction to Communicative English :** Meaning and Definition, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills. **3 Hrs**

**Unit-II**

**Introduction to Phonetics:** Sounds – consonants, vowels, and diphthongs, Syllables and Structure, Word Accent, Stress Shift and Intonation, Phonetic Transcription, Common Errors in Pronunciation. **3 Hrs**

**Unit-III**

**Vocabulary:** Word formation systems, Antonyms, Homophones, Homonyms, Affixes, Abbreviations, Strong and Weak forms of Words, Word pairs, One Word Substitutes and Error identification. **3 Hrs**

**Unit-IV**

**Grammar:** Parts of Speech, Articles and Preposition Tense, Sentences, Kinds of Sentences, Types of Sentences, Transformation of Sentences, Question Tags and Exercises on it. **3 Hrs**

**Unit-V**

**Communication Skills for Employment:** Presentation Skills, Extempore, Public Speaking, Mother Tongue Influence (MTI), Reading and Listening Comprehensions – Exercises. **3 Hrs**

**Reference Books:**

- 1) Sanjay Kumar & PushpLata, “Communication Skills”, Oxford University Press India Pvt Ltd, 2019
- 2) “A Textbook of English Language Communication Skills”, Infinite Learning Solutions Publishers, Bengaluru, 2022.
- 3) Gajendra Singh Chauhan et al, “Technical Communication”, Cengage learning India Pvt Limited [Latest Revised Edition], 2019.
- 4) N.P.Sudharshana and C.Savitha, “English for Engineers”, Cambridge University Press, 2018.
- 5) “English Language Communication Skills – Lab Manual cum Workbook”, Cengage learning India Pvt Limited [Latest Revised Edition], 2019.
- 6) D Praveen Sam and KN Shoba, “A Course in Technical English”, Cambridge University Press, 2020.
- 7) Michael Swan, “Practical English Usage”, Oxford University Press, 2016.
- 8) Rogers. C, Farson R.E., “Active Listening”, Gardon Training Inc.

- 9) Wood, Frederick, "A Remedial English Grammar for Foreign Students", Macmillan Education, India, 1990.
- 10) Yadugiri. M.A., "Making Sense of English – A Textbook of Sounds, Words, and Grammar", Viva Books, 2020.

**22KSK27 / 22KBK27      Samskrutika Kannada/ Balake Kannada      (1-0-0) 1**

**Contact Hours: 15**

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

Course Title:	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ		
Course Code:	22KSK17 / 27	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

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

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

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

**ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) :**

These are sample Strategies, which teacher can use to accelerate the attainment of the course outcomes.

1. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಬೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ವಸ್ತು ಆಧಾರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.
2. ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು - ಅಂದರೆ ಕವಿ-ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.
3. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಬೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.

## SDMCET: Syllabus

<b>ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)</b>
<ol style="list-style-type: none"> <li>1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ</li> <li>2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ</li> <li>3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ</li> </ol>
<b>ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)</b>
<ol style="list-style-type: none"> <li>1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.</li> <li>2. ಕೀರ್ತನೆಗಳು : ಅದರಿದೇನು ಫಲ ಇದರಿದೇನು ಫಲ - ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು</li> <li>3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ</li> </ol>
<b>ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)</b>
<ol style="list-style-type: none"> <li>1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಅಯ್ಯ ಕೆಲವು ಭಾಗಗಳು</li> <li>2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ</li> <li>3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು</li> </ol>
<b>ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)</b>
<ol style="list-style-type: none"> <li>1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ - ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್</li> <li>2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ</li> </ol>
<b>ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)</b>
<ol style="list-style-type: none"> <li>1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ</li> <li>2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ</li> </ol>

### Course outcome (Course Skill Set)

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

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

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

### 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.

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

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

Course Title:	ಬಳಕೆ ಕನ್ನಡ		
Course Code:	22KKBK17 / 27	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

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

The course (22KKBK17/27) 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.

**ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) :**

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. ಬಳಕೆ ಕನ್ನಡವನ್ನು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಬೋಧಿಸಲು ವಿಟಿಯು ಸೂಚಿಸಿರುವ ಪಠ್ಯಪುಸ್ತಕವನ್ನು ಉಪಯೋಗಿಸಬೇಕು.
2. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಉತ್ತೇಜಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.
3. ಪ್ರತಿ ವಿದ್ಯಾರ್ಥಿ ಪುಸ್ತಕವನ್ನು ತರಗತಿಯಲ್ಲಿ ಬಳಸುವಂತೆ ನೋಡಿಕೊಳ್ಳುವುದು ಮತ್ತು ಪ್ರತಿ ಪಾಠ ಮತ್ತು ಪ್ರವಚನಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಪೂರಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ತೊಡಗಿಸತಕ್ಕದ್ದು.
4. ಡಿಜಿಟಲ್ ತಂತ್ರಜ್ಞಾನದ ಮುಖಾಂತರ ಇತ್ತೀಚೆಗೆ ಡಿಜಿಟಲೀಕರಣ ಗೊಂಡಿರುವ ಭಾಷೆ ಕಲಿಕೆಯ ವಿಧಾನಗಳನ್ನು ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ಮುಖಾಂತರ ಚರ್ಚಿಸಲು ಕ್ರಮಕೈಗೊಳ್ಳುವುದು. ಇದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ತರಗತಿಯಲ್ಲಿ ಹೆಚ್ಚು ಏಕಾಗ್ರತೆಯಿಂದ ಪಾಠ ಕೇಳಲು ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ತೊಡಗಲು ಅನುಕೂಲವಾಗುತ್ತದೆ.
5. ಭಾಷಾಕಲಿಕೆಯ ಪ್ರಯೋಗಾಲಯದ ಮುಖಾಂತರ ಬಹುಬೇಗ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಕಲಿಯಲು ಅನುಕೂಲವಾಗುವಂತೆ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳನ್ನು ಮತ್ತು ಕ್ರಿಯಾ ಯೋಜನೆಗಳನ್ನು ರೂಪಿಸುವುದು.

**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

<b>Module - 2</b>	(03 hours of pedagogy)
<ol style="list-style-type: none"> <li>1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - <b>Possessive forms of nouns, dubitive question and Relative nouns</b></li> <li>2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು <b>Qualitative, Quantitative and Colour Adjectives, Numerals</b></li> <li>3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು -ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ - (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) - <b>Predictive Forms, Locative Case</b></li> </ol>	
<b>Module - 3</b>	(03 hours of pedagogy)
<ol style="list-style-type: none"> <li>1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - <b>Dative Cases, and Numerals</b></li> <li>2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು - <b>Ordinal numerals and Plural markers</b></li> <li>3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು &amp; ವರ್ಣ ಗುಣವಾಚಕಗಳು - <b>Defective/Negative Verbs &amp; Colour Adjectives</b></li> </ol>	
<b>Module- 4</b>	(03 hours of pedagogy)
<ol style="list-style-type: none"> <li>1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು <b>Permission, Commands, encouraging and Urging words (Imperative words and sentences)</b></li> <li>2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು <b>Accusative Cases and Potential Forms used in General Communication</b></li> <li>3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - <b>Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs</b></li> <li>4. ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ. <b>Comparative, Relationship, Identification and Negation Words</b></li> </ol>	
<b>Module - 5</b>	(03 hours of pedagogy)
<ol style="list-style-type: none"> <li>1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು - <b>Different types of Tense, Time and Verbs</b></li> <li>2. ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - <b>Formation of Past, Future and Present Tense Sentences with Verb Forms</b></li> <li>3. <b>Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation</b></li> </ol>	

**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.



**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.

**22IDT28**

**Innovation and Design Thinking**

**(1-0-0) 1**

**Contact Hours: 15**

**Course Learning Objectives (CLOs):** This course focuses on the following learning perspectives:

- 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.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Appreciate</b> various design process procedure.	-	-	3
<b>CO-2</b>	<b>Generate</b> and <b>develop</b> design ideas through different technique	-	-	3
<b>CO-3</b>	<b>Identify</b> the significance of reverse Engineering to Understand products.	-	-	6
<b>CO-4</b>	<b>Draw</b> technical drawing for design ideas.	-	-	1

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	1.0	-	1.0	-	-	1.0	-	-	-	-	-	-	-	-	-	-

**Pre-requisites:** None

**Contents:**

**Unit-I**

**Process Of Design:** Understanding Design thinking Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping **3 Hrs**

**Unit-II**

**Tools for Design Thinking:** Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design **3 Hrs**

**Unit-III**

**Design Thinking in IT Design:** Thinking to Business Process modelling – Agile in Virtual collaboration environment – Scenario based Prototyping **3 Hrs**

**Unit-IV**

**Design Thinking For strategic innovations:** Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design. **3 Hrs**

**Unit-V**

**Design thinking workshop:** Empathize, Design, Ideate, Prototype and Test **3 Hrs**

**Reference Books:**

- 1) John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) 2/E, 2013.
- 2) Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press, 2009.
- 3) Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011.
- 4) Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013.
- 5) Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, 2/E, 2011.
- 6) Jeanne Liedtka, Andrew King, and Kevin Bennett, "Solving Problems with Design Thinking - Ten Stories of What Works", Columbia Business School Publishing, 2013.

**CIE and SEE Evaluation (from 2023-24 batch)**

**Courses with LTP 3-0-0 and 4-0-0 or 2-2-0/3-2-0**

**Continuous Internal Evaluation (CIE):**

- Two Internal Assessments and one Improvement test each of 20 marks and one hour duration.
- Two higher scores from three tests are taken representing 40 marks.
- Question Paper pattern for Internal Assessment: 3 questions of 10 marks each with maximum of two sub divisions. Q.3 is compulsory and one question to be answered from Q.1 and Q.2.
- Course Teacher Assessment (CTA): Minimum two components such as quiz, seminar, written assignment, any technical activity related to course each of 5marks. Total CTA marks-10
- CIE=40 (from tests)+10(from CTA) =50 marks

**Semester End Examination (SEE):**

- SEE is conducted for 100 marks with 3 hours duration. It is reduced to 50 marks.
- Question Paper pattern for SEE: Five units with built in choice. Each question with maximum of three sub divisions.
- Two questions are to be set from each unit with built in choice, for example Q1 or Q2 in unit –I, Q 3 or Q 4 in unit-II and so on.
- A total of 5 full questions to be answered choosing one full question from each unit. All five units are to be answered compulsorily.
- Each question is of 20 marks.
- The Question paper is to be set for duration of 3 hours both for 3 and 4 credits courses.
- The Question paper is to be set for 100 marks for 3 and 4 credits courses.

**ASC(IC)/PCC with LTP 2-0-2, 3-0-2 and 2-2-2**

**Continuous Internal Evaluation (CIE):**

**Theory CIE component:**

- Two Internal Assessments and one Improvement test each of 20 marks and one hour duration.
- Two higher scores from three tests are taken representing 40 marks.
- Question Paper pattern for Internal Assessment: 3 questions of 10 marks each with maximum of two sub divisions. Q.3 is compulsory and one question to be answered from Q.1 and Q.2.

Course Teacher Assessment (CTA): Totally based on conduction of experiments as set by the course teacher.

**Laboratory component:**

- 5 marks: for conduction, regularity, involvement, journal writing, etc. Minimum 75% of attendance is compulsory. If the performance is not satisfactory in laboratory the student shall be detained and required to reregister for the course as a whole whenever offered next.
- 5 marks: Lab Test. A Lab test as per the class time table has to be conducted at the end for 50 marks and scale down to 5 marks.
- CIE for integrated course =40 (from IA tests)+10 (from CTA i.e. lab component) =50 marks.
- There will not be any remuneration for Final Lab Test since it is CTA of integrated course.
- Copy of the Marks list to be sent to the concerned course instructor immediately after the completion of test for that batch. Original Marks list to be maintained in the department.
- CIE=40(from tests)+10(from CTA i.e. lab component) =50 marks

**Semester End Examination (SEE):**

- SEE is conducted for 100 marks with 3 hours duration. It is reduced to 50 marks.
- Question Paper pattern for SEE: Five units with built in choice. Each question with maximum of three sub divisions.
- Two questions are to be set from each unit with built in choice, for example Q1 or Q2 in unit –I, Q 3 or Q 4 in unit-II and so on.
- A total of 5 full questions to be answered choosing one full question from each unit. All five units are to be answered compulsorily.
- Each question is of 20 marks.

- The Question paper is to be set for duration of 3 hours both for 3 and 4 credits courses.
- The Question paper is to be set for 100 marks for 3 and 4 credits courses.

**AEC/HSMS/UHV Courses with LTP 1-0-0:**

**Continuous Internal Evaluation (CIE)**

- Two Internal Assessments and one Improvement test each of 20 marks and one hour duration.
- Two higher scores from three tests are taken representing 40 marks.
- Question Paper pattern for Internal Assessment: MCQ 20 questions
- Course Teacher Assessment (CTA): Minimum two components such as quiz, seminar, written assignment, any technical activity related to course etc. each of 5 marks. Total CTA marks-10
- $CIE=40(\text{from tests})+10(\text{from CTA})=50$  marks

**Semester End Examination (SEE):**

- SEE is conducted for 50 marks of 1 hour duration. There will be 50 MCQs.
- Question Paper pattern for SEE: The question paper will contain 12 MCQ questions drawn from each Unit.
- Students have to answer 10 questions from each unit.
- All five units are to be answered compulsorily.