

Academic Program: UG

Academic Year 2022-23

Syllabus

I & II Semester B.E.

(Under NEP 2020)

Stream: Civil

Branch: Civil Engineering



SHRI DHARMASTHALA MANJUNATHESHWARA COLLEGE OF ENGINEERING
& TECHNOLOGY,

DHARWAD – 580 002

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

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SDM College of Engineering & Technology, Dharwad

It is certified that the scheme and syllabus for I & II semester of UG program in Civil Engineering is recommended by Board of Studies of Civil 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 2022 - 23 till further revision.

Principal

Chairman BoS & HoD

SDM COLLEGE OF ENGINEERING & TECHNOLOGY, DHARWAD

VISION AND MISSION OF THE INSTITUTE

Vision:

To develop competent professionals 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.

DEPARTMENT OF CIVIL ENGINEERING

VISION AND MISSION

Vision:

To be the center of excellence providing the state of art civil engineering education developing competent engineers responsible for serving modern society.

Mission:

The stated vision can be achieved through:

- The development of robust curricula to meet the industrial expectations.
- Interactive teaching-learning process with modern educational tools and soft skills.
- Establishing synergy between teaching and research with ethical values.
- Industry-Institute interaction.

Program Educational Objectives (PEOs)

I. Technical adeptness: The Civil Engineering Graduates will be technically adept to specific fields and other disciplines. Management towards Planning, Design, and Costing. Their technical skills and knowledge will enable them to perform their work with a commitment and quality, timeliness with continuous improvement.

II. Interpersonal Skills: Civil Engineering Graduates will exhibit effective interpersonal skills in teams and at workplace.

III. Awareness of Social impact: Graduates will be made aware of causes of impacts due to the development and to identify remedial measures if necessary.

IV. Professionalism: Understanding of professionalism, ethics, quality performance, sustainability and allow them to be professional leaders and contributors to society through their problem-solving capabilities and executing the work.

V. Continuous Learning: Civil Engineering Graduates will exhibit interest in lifelong learning including studies leading to professional licensure or higher studies in engineering that provides for continued development of their technical ability and management skills

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

- PO1.**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- PO2.**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.
- PO3.**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.
- PO4.**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.
- PO5.**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.
- PO6.**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.
- PO7.**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.
- PO8.**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9.Individual and teamwork: Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.

PO10.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.

PO11.Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply the set one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12.Lifelong learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context to technological change.

SDM COLLEGE OF ENGINEERING AND TECHNOLOGY DHARWAD

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2022-23)

I Semester
Stream: Civil
Branch: Civil Engineering

(For Chemistry Group)

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATC11	Mathematics – I for Civil Engg. Stream	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22CHEC12	Chemistry for Civil Engg. Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	22CED13	Computer Aided Engineering Drawing	Mech Engg Dept.	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC145	Introduction to C Programming	CSE Dept.	2	0	2	0	03	50	50	100	03
5	ETC-I	22ETC15B	Green Buildings	Civil Engg. Dept.	3	0	0	0	03	50	50	100	03
6	AEC	22PWS16	Professional Writing Skills in English	Humanities	1	0	0	0	01	50	50	100	01
7	HSMS	22IC017	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	AEC/SDC	22SFH18	Scientific Foundations for Health	Civil Engg. Dept.	1	0	0	0	01	50	50	100	01
TOTAL					14	04	08	0	17	400	400	800	20

SDM COLLEGE OF ENGINEERING AND TECHNOLOGY DHARWAD

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2022-23)

II Semester
Stream: Civil
Branch: Civil Engineering

(For Physics Group)

Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC(IC)	22MATC21	Mathematics - II for Civil Engg. Stream	Maths	2	2	2	0	03	50	50	100	04
2	ASC(IC)	22PHYC22	Physics for Civil Engg. Stream	PHY	2	2	2	0	03	50	50	100	04
3	ESC	22CIV23	Engineering Mechanics	Civil Dept.	2	2	0	0	03	50	50	100	03
4	ESC-II	22ESC244	Introduction to Mechanical Engineering	Mechanical Dept	3	0	0	0	03	50	50	100	03
5	PLC-II	22PLC25B	Introduction to Python Programming	ISE Dept	2	0	2	0	03	50	50	100	03
6	AEC	22ENG26	Communicative English	Humanities	1	0	0	0	01	50	50	100	01
7	HSMC	22KSK27/ 22KKBK27	Sanskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	01	50	50	100	01
8	AEC/SDC	22IDT29	Innovation and Design Thinking	Civil Engg. Dept.	1	0	0	0	01	50	50	100	01
TOTAL					14	06	06	0	17	400	400	800	20

SDA-Skill Development Activities, **TD/PSB**- Teaching Department / Paper Setting Board, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **ETC**- Emerging Technology Course, **AEC**- Ability Enhancement Course, **HSMS**-Humanity and Social Science and management Course, **SDC**- Skill Development Course,

Mathematics I for Civil Engineering Stream

Course title:	Mathematics-I for Civil Engineering stream		
Course code:	22MATC11	CIE Marks	50
Course Type	Integrated	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10 to12 Lab sessions	Credits	04

Course objectives:

- To familiarize the importance of calculus associated with one variable and two variables for civil engineering.
- To analyze Civil engineering problems applying Ordinary Differential equations.
- To develop the knowledge of Linear Algebra refereeing to matrices.

Course outcome

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs (1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Apply the knowledge of calculus to solve problems related to polar curves.			1,2,12
CO-2	Learn the notion of partial differentiation to compute rate of change of multivariate functions.			1,2,12
CO-3	Analyze the solution of linear and nonlinear ordinary differential equations.			1,2,12
CO-4	Make use of matrix theory for solving for system of linear equations and compute eigenvalues and eigenvectors.			1,2,12
CO-5	Familiarize with modern mathematical tools namely Mathematica/ Matlab/ Python/ Scilab			1,2,12

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	1	1										1

Module-1 Calculus (8 hours)

Introduction to polar coordinates and curvature relating to Civil engineering.

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

Self-study: Center and circle of curvature, evolutes and involutes.
Applications: Structural design and paths, Strength of materials, Elasticity.

Module-2 Series Expansion and Multivariable Calculus (8 hours)

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

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

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

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

Applications: Computation of stress and strain, Errors and approximations, Estimating the critical points and extreme values.

Module-3 Ordinary Differential Equations (ODEs) of first order (8 hours)

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

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

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

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

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

Module-4 Ordinary Differential Equations of higher order (8 hours)

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

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

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

Applications: Oscillations of a spring, Transmission lines, Highway engineering.

Module-5 Linear Algebra (8 hours)

Introduction of linear algebra related to Civil Engineering applications.

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

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

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

10 lab sessions + 1 repetition class + 1 Lab Assessment

- 2D plots for Cartesian and polar curves
- Finding angle between polar curves, curvature and radius of curvature of a given curve
- Finding partial derivatives, Jacobian and plotting the graph
- Applications to Maxima and Minima of two variables
- Solution of first-order differential equation and plotting the graphs
- Solutions of Second-order ordinary differential equations with initial/boundary conditions
- Solution of a differential equation of oscillations of a spring/deflection of a beam with different loads
- Numerical solution of system of linear equations, test for consistency and graphical representation
- Solution of system of linear equations using Gauss-Seidel iteration
- Compute eigenvalues and eigenvectors and find the largest and smallest eigenvalue by
- Rayleigh power method.

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

Reference Books:

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

Web links and Video Lectures (e-Resources):

- <http://nptel.ac.in/courses.php?disciplineID=111>
- [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
- <http://academicearth.org/>
- VTU e-Shikshana Program
- VTU EDUSAT Program

Chemistry for Civil Engineering stream

Course title:	Chemistry for Civil Engineering stream		
Course code:	22CHEC12	CIE Marks	50
Course Type	Integrated	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L: T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10 to 12 Lab sessions	Credits	04

Course objectives:

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

Course outcomes:

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

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	3	1	1				1					

Module-1: Structural Materials (8 hours)

Metals and Alloys: Introduction, Properties and application of Iron and its alloys, Aluminium and its alloys.

Cement: Introduction, composition, properties, classification, manufacturing process of cement, process of setting and hardening of cement, additives for cement and testing of cement.

Refractories: Introduction, classification based on chemical composition, properties and application of refractory materials.

Glass: Introduction, Composition, Types, Preparation of Soda-lime glass, properties and applications of glass.

Self-learning: Chemistry of reinforced concrete from various sources of water (seawater, groundwater, treated water).

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

Energy conversion: Introduction, construction, working, and applications of Photovoltaic cells, methanol-oxygen fuel cell.

Storage devices: Introduction, construction and working of Li-ion battery.

Corrosion: Introduction, electrochemical corrosion of steel in concrete, types (differential metal and aeration), Stress corrosion in civil structures, corrosion control (design and selection of materials, galvanization, anodization and sacrificial anode method).

Self-learning: Corrosion inhibitors.

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

Water technology: Introduction, water parameters, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by ion exchange method, desalination of water by electro dialysis, determination of COD, numerical problems. Forward osmosis: Introduction, Process and applications.

Nanotechnology: Introduction, size dependent properties of nanomaterial (surface area and catalytic), Synthesis of nanomaterial by sol-gel method and co-precipitation method.

Nano materials: Introduction, properties and engineering applications of carbon nanotubes, graphene and nanomaterials for water treatment (Metal oxide).

Self-learning: Sewage treatment (Primary, secondary and tertiary).

Module-4: Polymer and Composites (8 hours)

Polymer: Introduction, methods of polymerization, molecular weight of polymers, numerical problems. Synthesis, properties and engineering applications of polyethylene (PE) and polyvinyl chloride (PVC).

Fibers: Synthesis, properties and applications of polypropylene and nylon fibers.

Polymer composites: Introduction, properties and applications of fiber reinforced polymers composites (FRPC),

Geo polymer concrete: Introduction, synthesis, constituents, properties and applications.

Adhesives: Introduction, properties and applications of epoxy resin.

Biodegradable polymers: Synthesis of polylactic acid (PLA) and their applications.

Self-learning: Biopolymer: Introduction, structural properties, and applications of cellulose and lignin.

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

Phase rule: Introduction, Definition of terms: phase, components, degree of freedom, phase rule equation. Phase diagram: Two component-lead-silver system.

Analytical techniques: Introduction, principle, instrumentation of potentiometric sensors and its application in the estimation of iron, conductometric sensors and its application in the estimation of acid mixture, Optical sensors and its application in the estimation of the beverages, pH-sensors and its application in the determination of soil sample.

Self-learning: Chromatographic technique, application of chromatography (column and thin-layered chromatography) in the separation of components.

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

10 lab sessions + 1 repetition class + 1 Lab Assessment

A – Demonstration (any two) offline/virtual:

A1. Synthesis of polyurethane

A2. Quantitative estimation of Aluminium by precipitation method

A3. Synthesis of iron oxide nanoparticles

A4. Determination of chloride content in the given water sample by Argentometric method

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

B1. Conductometric estimation of acid mixture

B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$

B3. Determination of pKa of vinegar using pH sensor (Glass electrode)

B4. Determination of rate of corrosion of mild steel by weight loss method

B5. Estimation of total hardness of water by EDTA method

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

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry) C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)

C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method

C4. Estimation of Sodium present in soil/effluent sample using flame photometry

C5. Determination of Chemical Oxygen Demand (COD) of industrial wastewater sample

D – Open Ended Experiments (any two):

D1. Gravimetric estimation of gypsum in Portland cement

D2. Electroplating of desired metal on substrate D3. Estimation of manganese dioxide in pyrolusite D4. Analysis of cement for its components

Reference Books:

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi.
3. A Textbook of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl & Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. Groukrishana, Vikas Publishing

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

Web links and Video Lectures (e-Resources):

- <http://libgen.rs/>

- <https://nptel.ac.in/downloads/122101001/>
- <https://nptel.ac.in/courses/104/103/104103019/>
- <https://ndl.iitkgp.ac.in/>

Computer Aided Engineering Drawing

Course title:	Computer Aided Engineering Drawing		
Course code:	22CAED13	CIE Marks	50
Course Type	Integrated	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	3
Total Hours of Pedagogy	40	Credits	3

Course objectives:

- 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:

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

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	3	2.2			3	1		1	1	3		1.8

Module-1 (8 Hours)

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.

Module-2 (8 Hours)

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.

Module-3 (8 Hours)

Isometric Projections:

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

Conversion of simple isometric drawings into orthographic views.

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

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

Module-4 (8 Hours)

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 (For CIE Only)

Module-5 (8 Hours)

Multidisciplinary Applications & Practice (For CIE Only):

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

Drawing Simple Mechanisms; Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts to dimensions etc

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

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

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

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

Reference Books

1. Bhattacharya S. K., Electrical Engineering Drawing, New Age International publishers, second edition 1998, reprint 2005.
2. Chris Schroder, Printed Circuit Board Design using AutoCAD, Newnes, 1997.
3. K S Sai Ram Design of steel structures, , Third Edition by Pearson
4. Nainan p kurian Design of foundation systems, Narosa publications
5. A S Pabla, Electrical power distribution, 6th edition, Tata Mcgraw hill
6. Bhatt, N.D., Engineering Drawing: Plane and Solid Geometry, 53rd edition, Charotar Publishing House Pvt.Limited, 2019.

Introduction to C Programming

Course title:	Introduction to C Programming		
Course code:	22ESC145	CIE Marks	50
Course Type	Integrated	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	3
Total Hours of Pedagogy	40 hours (Including lab sessions)	Credits	3

Course objectives:

- Elucidate the basic architecture and functionalities of a Computer.
- Apply programming constructs of C language to solve the real-world problems.
- Explore user-defined data structures like arrays, structures and pointers in implementing solutions to problems.
- Design and Develop Solutions to problems using modular programming constructs such as functions and procedures.

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs (1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Elucidate the basic architecture and functionalities of a computer and recognize the hardware parts.			1

CO-2	Apply programming constructs of C language to solve the real-world problem		1,2,3	
CO-3	Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting.		1,2,3	
CO-4	Explore user-defined data structures like structures, unions and pointers in implementing solutions.		1,2,3	
CO-5	Design and Develop Solutions to problems using modular programming constructs using functions.		1,2,3	

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	1.8	2	2									

Module-1 (8 Hours)

Introduction to C: Introduction to computers, input and output devices, designing efficient programs. Introduction to C, Structure of C program, Files used in a C program, Compilers, Compiling and executing C programs, variables, constants, Input/output statements in C.

Module-2 (8 Hours)

Operators in C, Type conversion and typecasting.

Decision control and Looping statements: Introduction to decision control, Conditional branching statements, iterative statements, nested loops, break and continue statements, goto statement.

Module-3 (8 Hours)

Functions: Introduction using functions, Function definition, function declaration, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive functions.

Arrays: Declaration of arrays, accessing the elements of an array, storing values in arrays, Operations on arrays, Passing arrays to functions,

Module-4 (8 Hours)

Two dimensional arrays, operations on two-dimensional arrays, two-dimensional arrays to functions, multidimensional arrays.

Applications of arrays and introduction to strings: Applications of arrays, case study with sorting techniques.

Introduction to strings: Reading strings, writing strings, summary of functions used to read and write characters. Suppressing input using a Scanset.

Module-5 (8 Hours)

Strings: String taxonomy, operations on strings, Miscellaneous string and character functions, arrays of strings.

Pointers: Understanding the Computers Memory, Introduction to Pointers, Declaring Pointer Variables
Structures: Introduction to structures.

Reference Books:

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGraw-Hill.
2. Brian W. Kernighan and Dennis M. Ritchie, The ‘C’ Programming Language, Prentice Hall of India.
3. Computer fundamentals and programming in c, “Reema Thareja”, Oxford University, Second edition, 2017.

Web links and Video Lectures (e-Resources):

- elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html
- <https://nptel.ac.in/courses/106/105/106105171/> MOOC courses can be adopted for more clarity in understanding the topics and verities of problem-solving methods.

Green Buildings

Course title:	Green Buildings		
Course code:	22ETC15B	CIE Marks	50
Course Type	Theory	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	3
Total Hours of Pedagogy	40	Credits	3

Course objectives:

- Understand the Definition, Concept & Objectives of the terms cost effective construction and green building.
- Apply cost effective techniques in construction.
- Apply cost effective Technologies and Methods in Construction.
- Understand the Problems due to Global Warming.
- State the Concept of Green Building.
- Understand Green Buildings.

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Select different building materials for construction.		1	2,6,7
CO-2	Apply effective environmental friendly building technology.		1	2,6,7

CO-3	Analyze global warming due to different materials in construction.		1	2,6,7
CO-4	Analyse buildings for green rating.		1	2,6,7
CO-5	Use alternate source of energy and effective use water.		1	2,6,7

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	2	1				1	1					

Module-1 (08 Hours)

Introduction to the concept of cost-effective construction -Uses of different types of materials and their availability -Stone and Laterite blocks- Burned Bricks- Concrete Blocks- Stabilized Mud Blocks- Lime Pozzolana Cement- Gypsum Board- Light Weight Beams- Fiber Reinforced Cement Components- Fiber Reinforced Polymer Composite- Bamboo- Availability of different materials- Recycling of building materials – Brick-Concrete- Steel- Plastics - Environmental issues related to quarrying of building materials.

Module-2 (08 Hours)

Environment friendly and cost effective Building Technologies - Different substitute for wall construction Flemish Bond - Rat Trap Bond – Arches – Panels - Cavity Wall - Ferro Cement and Ferro Concrete constructions – different pre cast members using these materials - Wall and Roof Panels – Beams – columns - Door and Window frames - Water tanks - Septic Tanks - Alternate roofing systems - Filler Slab - Composite Beam and Panel Roof -Pre-engineered and ready to use building elements - wood products - steel and plastic - Contributions of agencies - Costford - Nirmithi Kendra - Habitat

Module-3(08 Hours)

Global Warming – Definition - Causes and Effects - Contribution of Buildings towards Global Warming - Carbon Footprint – Global Efforts to reduce carbon Emissions Green Buildings – Definition - Features- Necessity – Environmental benefit - Economical benefits - Health and Social benefits - Major Energy efficient areas for buildings – Embodied Energy in Materials Green Materials - Comparison of Initial cost of Green V/s Conventional Building - Life cycle cost of Buildings.

Module-4 (08 Hours)

Green Building rating Systems- BREEAM – LEED - GREEN STAR -GRIHA (Green Rating for Integrated Habitat Assessment) for new buildings – Purpose - Key highlights - Point System with Differential weight age. Green Design – Definition - Principles of sustainable development in Building Design - Characteristics of Sustainable Buildings – Sustainably managed Materials - Integrated Lifecycle design of Materials and Structures (Concepts only)

Module-5 (08 Hours)

Utility of Solar Energy in Buildings

Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings.

Green Composites for Buildings

Concepts of Green Composites. Water Utilisation in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment.

Reference Books:

1. Harharalyer G, Green Building Fundamentals, Notion Press.
2. Dr. Adv. HarshulSavla, Green Building: Principles & Practices.

Web links and Video Lectures (e-Resources):

- <https://www.youtube.com/watch?v=THgQF8zHBW8>
- https://www.youtube.com/watch?v=DRO_rIkywxQ

Professional Writing Skills in English

Course title:	Professional Writing Skills in English		
Course code:	22PWS16	CIE Marks	50
Course Type	Theory	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	1
Total Hours of Pedagogy	15	Credits	1

Course objectives:

- 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:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Explain and identify the Common Errors in Writing and Speaking.		10	
CO-2	Achieve better Technical writing and Presentation skills.		10	

CO-3	Read Technical proposals properly and make them to Write good technical reports.	10		
CO-4	Acquire Employment and Workplace communication skills.		10	
CO-5	Learn about Techniques of Information Transfer through presentation in different level.	10		

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level										2.4		

Contents:

Module-1 (3 Hours)

Identifying Common Errors in Writing and Speaking English: Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused / Misused.

Module-2 (3 Hours)

Nature and Style of sensible writing: Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.

Module-3 (3 Hours)

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.

Module-4 (3 Hours)

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

Module-5 (3 Hours)

Professional Communication at Workplace: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and its

importance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.

Reference Books:

- “Professional Writing Skills in English” published by Fillip Learning – Education (ILS), Bangalore – 2022.
- “Functional English” (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019].
- English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
- Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
- Technical Communication – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
- High School English Grammar & Composition by Wren and Martin, S Chandh & Company Ltd – 2015.
- Effective Technical Communication – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private.

Indian Constitution

Course title:	Indian Constitution		
Course code:	22ICO17	CIE Marks	50
Course Type	Theory	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	1
Total Hours of Pedagogy	15	Credits	1

Course objectives:

- 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:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Analyse the basic structure of Indian Constitution.	8		6,7

CO-2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.	8		6,7
CO-3	Know about our Union Government, political structure & codes, procedures.	8		6,7
CO-4	Understand our State Executive & Elections system of India.	8		6,7
CO-5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.	8		6,7

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level						1	1	3				

Module-1 (03 hours)

Indian Constitution: 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.

Module-2 (03 hours)

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

Module-3 (03 hours)

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.

Module-4 (03 hours)

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.

Module-5 (03 hours)

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.

Textbook:

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

Reference Books:

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

Scientific Foundations of Health

Course title:	Scientific Foundations of Health		
Course code:	22SFH18	CIE Marks	50
Course Type	Theory	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	1
Total Hours of Pedagogy	15	Credits	1

Course objectives:

- To know about Health and wellness (and its Beliefs) & It's 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:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.	9,12		
CO-2	Develop the healthy lifestyles for good health for their better future.	9,12		
CO-3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.	9,12		

CO-4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.	9,12		
CO-5	Prevent and fight against harmful diseases for good health through positive mindset.	9,12		

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level									3			3

Module-1 (03 hours)

Good Health & It's balance for positive mindset: Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behaviour, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.

Module-2 (03 hours)

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.

Module-3 (03 hours)

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

Module-4 (03 hours)

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

Module-5 (03 hours)

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

Textbook:

1. "Scientific Foundations of Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU - University Website.

2. "Scientific Foundations of Health", (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
3. Health Psychology - A Textbook, FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference Books:

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

CIE and SEE Evaluation (from 2022-23 batch)

CIE for Non-integrated Courses: With LTP 3-0-0 and 4-0-0 or 2-2-0/3-2-0

Two tests + One Improvement tests: (20+20+20 each of one-hour duration)

Two higher scores from three tests are taken representing 40 marks

QP pattern: 3 questions- Q.3 is compulsory and one question to be answered from Q.1 and Q.2, each question can be with maximum of two subdivisions.

CTA: Minimum two components such as assignments, quiz, seminar, written assignment, any technical activity related to course etc. each of 5 marks. Total CTA marks- 10

CIE= 40(from tests) +10(from CTA) = 50 marks

SEE: Exam will be conducted for 100 marks with 3 hours duration and will be scaled down to 50 marks. Five modules with built in choice. Each question can be with maximum of three subdivisions.

CIE for Integrated Courses: With LTP 2-0-2 and 3-0-2 and 2-2-2

Theory CIE component:

Two tests + One Improvement tests (20+20+20 each of one hour duration)

Two higher scores from three tests are taken representing 40 marks

QP pattern: 3 questions- Q.3 is compulsory and one question to be answered from Q.1 and Q.2, each question can be with maximum of two subdivisions.

Practical CIE component (CTA): Laboratory component. 5 marks for conduction, regularity, involvement, journal etc. Lab Test -5 marks. A test as per the schedule announced will be conducted at the end for 50 marks and scaled down to 5 marks. 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.

CIE= 40(from tests) +10(from CTA i.e. lab component) = 50 marks

SEE: Exam will be conducted for 100 marks with 3 hours duration and will be scaled down to 50 marks. Five modules with built in choice. Each question can be with maximum of three subdivisions. The questions shall be asked to test practical understanding for maximum of 30 marks.

CIE for AEC/HSMS Courses: With LTP 1-0-0 for 1 Credit

- CIE for 1 credit AEC/HSMS Courses with LTP 1-0-0.
- Two tests + One Improvement tests.
- 20+20+20 each of one-hour duration.
- QP pattern for IA: MCQ 15 questions.
- Two higher scores from three tests are taken representing 40 marks.
- CTA: Minimum two components such as assignments, quiz, seminar, written assignment, any learning activity related to the course etc. each of 5 marks.
- CIE= 40(from tests) +10(from CTA) = 50 marks.
- SEE: Exam will be conducted for 50 marks with 1 hour duration. There will be 50 MCQs. The question paper will contain 10 MCQ questions from each module.

II Semester

Mathematics - II for Civil Engineering stream

Course title:	Mathematics - II for Civil Engineering stream		
Course code:	22MATC21	CIE Marks	50
Course Type	Integrated	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	3
Total Hours of Pedagogy	40 hours Theory + 10 to 12 Lab sessions	Credits	4

Course objectives:

- Familiarize the importance of Integral calculus and Vector calculus essential for civil engineering.
- Analyze Civil engineering problems by applying Partial Differential Equations.
- Develop the knowledge of solving civil engineering problems numerically.

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Apply the knowledge of multiple integrals to compute area and volume.			1,2,12
CO-2	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line.			1,2,12
CO-3	Demonstrate partial differential equations and their solutions for physical interpretations.			1,2,12
CO-4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.			1,2,12
CO-5	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab.			1,2,12

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	1	2	12									

Module-1 Integral Calculus (8 hours)

Introduction to Integral Calculus in Civil Engineering applications.

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

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

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

Applications: Applications to mathematical quantities (Area, Surface area, Volume), Analysis of probabilistic models.

Module-2 Vector Calculus (8 hours)

Introduction to Vector Calculus in Civil Engineering applications.

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

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

Self-Study: Volume integral and Gauss divergence theorem.

Applications: Heat and mass transfer, oil refinery problems, environmental engineering. Analysis of streamlines, velocity and acceleration of a moving particle.

Module-3 Partial Differential Equations (PDEs) (8 hours)

Importance of partial differential equations for Civil Engineering applications

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

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

Applications: Design of structures (vibration of rod/membrane)

Module-4 Numerical Methods -1 (8 hours)

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

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

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

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. Finding approximate solutions to civil engineering problems.

Module-5 Numerical Methods -2 (8 hours)

Introduction to various numerical techniques for handling Civil Engineering applications.

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

Self-Study: Adam-Bashforth method.

Applications: Finding approximate solutions to ODE related to civil engineering fields.

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

10 lab sessions + 1 repetition class + 1 Lab Assessment

- 1 Program to compute surface area, volume and centre of gravity.
- 2 Evaluation of improper integrals.
- 3 Finding gradient, divergent, curl and their geometrical interpretation.
- 4 Verification of Green's theorem.
- 5 Solution of one-dimensional heat equation and wave equation.
- 6 Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson method.
- 7 Interpolation/Extrapolation using Newton's forward and backward difference formula.
- 8 Computation of area under the curve using Trapezoidal, Simpson's (1/3)rd and (3/8)th rule Solution of ODE of first order and first degree by Taylor's series and Modified Euler's method
- 9 Solution of ODE of first order and first degree by Runge-Kutta 4th order and Milne's predictor-corrector method

Textbooks

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

Reference Books

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

8. David C Lay: “Linear Algebra and its Applications”, Pearson Publishers, 4th Ed., 2018.
9. Gareth Williams: “Linear Algebra with applications”, Jones Bartlett Publishers Inc., 6th Ed., 2017.

Web links and Video Lectures (e-Resources):

- <http://nptel.ac.in/courses.php?disciplineID=111>.
- [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs)).
- <http://academicearth.org/>
- VTU e-Shikshana Program.
- VTU EDUSAT Program.

Physics for Civil Engineering Stream

Course title:	Physics for Civil Engineering Stream		
Course code:	22PHYC22	CIE Marks	50
Course Type	Integrated	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	3
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab sessions	Credits	4

Course objectives:

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

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs (1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Elucidate the concepts in oscillations, waves, elasticity and material failures.	1	2,12	5
CO-2	Summarize concepts of acoustics in buildings and explain the concepts in radiation and photometry.	1	2,12	
CO-3	Discuss the principles of photonic devices and their application relevant to civil engineering.	1	2,12	

CO-4	Describe the various natural hazards and safety precautions.	1,2	12	6
CO-5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements	1,8,9	2,5,12	3

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	3	2.2			1.5	1		3	3			2

Module-1 (8 Hours)

Oscillations and Shock waves:

Oscillations: Simple Harmonic motion (SHM), the differential equation for SHM (no derivation), Springs: Stiffness Factor and its Physical Significance, series and parallel combination of springs (Derivation), Types of spring and their applications. Theory of damped oscillations (Qualitative), Types of damping (Graphical Approach). Engineering applications of damped oscillations, Theory of forced oscillations (Qualitative), resonance, sharpness of resonance. Numerical problems.

Shock waves: Mach number and Mach Angle, Mach Regimes, definition and characteristics of Shock waves, Construction and working of Reddy shock tube, Applications of Shock Waves, Numerical problems.

Pre-requisites: Basics of Oscillations

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

Module-2 (8 Hours)

Elasticity:

Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio and its limiting values. Relation between σ , ϵ and ν (with derivation), beams, bending moment and derivation of expression, Cantilever and I section girder and their Engineering Applications, Elastic materials (qualitative). Failures of engineering materials - ductile fracture, brittle fracture, stress concentration, fatigue and factors affecting fatigue (only qualitative explanation) Numerical problems.

Pre-requisites: Elasticity, Stress & Strain

Self-learning: Stress-Strain Curve

Module-3 (8 Hours)

Acoustics, Radiometry and Photometry:

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

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

Pre-requisites: Basics of Sound, Waves & light properties

Self-learning: Introduction to acoustics

Module-4 (8 Hours)

Photonics:

LASER: Properties of a LASER Beam, Interaction of Radiation with Matter, LASER action, Population Inversion, Metastable State, Requisites of a LASER System, Semiconductor LASER, LASER Range Finder, LIDAR, Road

Profiling, Bridge Deflection, Speed Checker. Numerical Problems.

Optical Fiber: Principle and Construction of Optical Fibers, Acceptance angle and NA, Expression for NA, Modes of Propagation, Attenuation and Fiber Losses, Fiber Optic Displacement Sensor, Fiber Optic Temperature Sensor, Numerical problems.

Pre-requisite: Properties of light.

Self-learning: Propagation Mechanism & TIR in optical fibre.

Module-5 (8 Hours)

Natural hazards and Safety:

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

Pre-requisite: Oscillations

Self-learning: Richter scale

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

1. Materials Science and Engineering by R Balasubramaniam, second edition, Wiley India Pvt. Ltd. Ansari Road, Daryaganj, New Delhi-110002.
2. A textbook of Engineering Physics by M.N. Avadhanulu, P G. Kshirsagar and T V S Arun Murthy, Eleventh edition, S Chand and Company Ltd. New Delhi-110055.
3. Engineering Physics by R. K. Gaur and S. L. Gupta, 2010 edition, Dhanpat Rai Publications Ltd., New Delhi-110002,
4. Building Science: Lighting and Acoustics, B. P. Singh and Devaraj Singh, Dhanpat Rai Publications (P) Ltc.,
5. Building Acoustics: Tor Eric Vigran, Taylor and Francis, 2008 Edition.
6. Photometry Radiometry and Measurements of Optical Losses, MichealBukshab, Springer, 2nd edition.
7. Materials Science for Engineers by James F. Shackelford and Madanapalli K Muralidhara, sixth edition, Pearson Education Asia Pvt. Ltd., New Delhi.
8. Lasers and Non-Linear Optics, B B Loud, New Age Internationals, 2011 edition
9. Shock waves made simple by Chintoo S Kumar, K Takayama and K P J Reddy: Willey India Pvt. Ltd, Delhi 2014.

10. An Introduction to Disaster Management, Natural Disaster & Man-Made Hazards, S. Vaidyanathan, IKON Books P
11. Natural Hazards, Edward Bryant, Cambridge University Press, 2nd Edition
12. Natural hazards, Earthquakes, Volcanoes, and landslides by Ramesh P Singh, and Darius Bartlett, CRC Press, Taylor and Francis group.
13. Principles of Fire Safety Engineering Understanding Fire & Fire Protection, Akhil Kumar Das, PHI Learning, II Edition.
14. Disaster Management, R.Subramanian,S. Chand Publishing,2018.

Web links:

- Simple Harmonic motion:<https://www.youtube.com/watch?v=k2FvSzWeVxQ>
- Shock waves:<https://physics.info/shock/>
- Shock waves and its applications:https://www.youtube.com/watch?v=tz_3M3v3kxk
- Stress-strain curves:<https://web.mit.edu/course/3/3.11/www/modules/ss.pdf>
- Stress curves:<https://www.youtube.com/watch?v=f08Y39UiC-o> Oscillations and waves :<https://openstax.org › books › college-physics-2e> Earthquakes:www.asc-india.org
- Earthquakes and Hazards:<http://quake.usgs.gov/tsunami>
- Landslide hazards:<http://landslides.usgs.gov>
- Acoustics:<https://www.youtube.com/watch?v=fHBPvMDFyO8>

Activity Based Learning (Suggested Activities in Class)/ Practical Based Learning
<http://nptel.ac.in> <https://swayam.gov.in> https://virtuallabs.merlot.org/vl_physics.html
<https://phet.colorado.edu>
<https://www.myphysicslab.com>

Laboratory Component:

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

Note: The experiments have to be classified into

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

Based on convenience classify the following experiments into the above categories.

Select at least one simulation/spreadsheet activity.

List of Experiments:

1. Uniform Bending
2. n by Torsional Pendulum
3. Forced Mechanical Oscillations and resonance
4. Series & Parallel Resonance
5. Fermi Energy of Conductor
6. Resistivity by Four Probe Method
7. Spring Constant
8. Single Cantilever
9. I by torsional pendulum
10. Laser Diffraction
11. Optical Fiber

12. Newton's Rings
13. GNU Step Interactive Simulations
14. Study of motion using spread Sheets
15. Application of Statistics using Spread Sheet
16. PHET Interactive Simulations:
(<https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype>)

Engineering Mechanics

Course title:	Engineering Mechanics		
Course code:	22CIV23	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40	Credits	3

Course objectives:

- To develop students' ability to analyze the problems involving forces, moments with their applications.
- To analyse the member forces in trusses.
- To make students to learn the effect of friction on different planes.
- To develop the student's ability to find out the centre of gravity and moment of inertia and their applications.
- To make the students learn about kinematics and kinetics and their applications.

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs (1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Compute the resultant of a force system and resolution of a force.	2	1	
CO-2	Comprehend the action for forces, moments, and other types of loads on rigid bodies and compute the reactive forces.	2	1	
CO-3	Analyze the frictional resistance offered by different planes.	2	1	
CO-4	Locate the centroid and compute the moment of inertia of sections.	2	1	
CO-5	Analyze the bodies in motion.	2	1	

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	2	3										

Module-1 (8 hours)

Resultant of coplanar force system: Basic dimensions and units, Idealisations, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment, Principle of moments, couple, Resultant of coplanar concurrent force system, Resultant of coplanar non-concurrent force system, Numerical examples.

Module-2 (8 hours)

Equilibrium of coplanar force system: Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical examples.

Module-3 (8 hours)

Analysis of Trusses: Introduction, Classification of trusses, analysis of plane perfect trusses by the method of joints and method of sections, Numerical examples.
Friction: Introduction, laws of Coulomb friction, equilibrium of blocks on horizontal plane, equilibrium of blocks on inclined plane, ladder friction, wedge friction Numerical examples.

Module-4 (8 hours)

Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle, quadrant and sector of a circle using method of integration, centroid of composite areas and simple built up sections, Numerical examples.
Moment of inertia of plane areas: Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built up sections, Numerical examples.

Module-5 (8 hours)

Kinematics:

Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity,

Numerical examples on linear motion.

Projectiles: Introduction, numerical examples on projectiles.

Kinetics: Introduction, D'Alembert's principle of dynamic equilibrium and its application in-plane motion and connected bodies including pulleys, Numerical examples.

Reference Books:

1. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015, Laxmi Publications.
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2014, EBPB.
3. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill.
4. Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall.

5. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.
6. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press.
7. Bhavikatti S S, Engineering Mechanics, 2019, New Age International.
8. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication.

Introduction to Mechanical Engineering

Course title:	Introduction to Mechanical Engineering		
Course code:	22ESC244	CIE Marks	50
Course Type	Theory	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	3
Total Hours of Pedagogy	40	Credits	3

Course objectives:

- To develop basic Knowledge on Mechanical Engineering, Fundamentals and Energy Sources.
- Understand the concept of different types of Machine tool operations and Modern Manufacturing Processes like CNC, 3D printing.
- To know the concept of IC engines and Future Mobility vehicles.
- To give exposure in the field of Engineering Materials and Manufacturing Processes Technology and its applications
- To acquire a basic understanding role of Mechanical Engineering in the Robotics and Automation in industry.

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Explain the concepts of Role of Mechanical Engineering and Energy sources.	1	7	6,10,12
CO-2	Describe the Machine Tool Operations and advanced Manufacturing process.	1		6,7,10,12
CO-3	Explain the Working Principle of IC engines and EV vehicles.	1		6,7,10,12
CO-4	Discuss the Properties of Common Engineering Materials and various Metal Joining Processes.	1		6,7,10,12

CO-5	Explain the Concepts of Mechatronics, Robotics and Automation in IoT.	1		6,7,10,12
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POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	3					1	1.2			1		1

Module-1 (8 hours)

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

Energy: Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel, Solar, wind, and biofuels, Environmental issues like Global warming and Ozone depletion

Module-2 (8 hours)

Machine Tool Operations:

Working Principle of lathe, Lathe operations: Turning, facing, knurling. Working principles of Drilling Machine, drilling operations: drilling, boring, reaming. Working of Milling Machine, Milling operations: plane milling and slot milling.

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

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

Module-3 (8 hours)

Introduction to IC Engines: Components and Working Principles, 4-Stroke Petrol and Diesel Engines, Application of IC Engines.

Insight into Future Mobility; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of EVs and Hybrid vehicles.

Module-4 (8 hours)

Engineering Materials: Types and applications of Ferrous & Nonferrous Metals, silica, ceramics, glass, graphite, diamond and polymer. Shape Memory Alloys.

Joining Processes: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding and types of flames.

Module-5 (8 hours)

Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Classification based on robotics configuration: polar cylindrical, Cartesian coordinate and spherical. Application, Advantages and disadvantages.

Automation in industry: Definition, types – Fixed, programmable and flexible automation, basic elements with block diagrams, advantages.

Introduction to IOT: Definition and Characteristics, Physical design, protocols, Logical design of IoT, Functional blocks, and communication models.

Reference Books:

1. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008.

2. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012.
3. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, Media Promoters and Publishers Pvt. Ltd., 2010.
4. Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rdEd., 2003.
5. Internal Combustion Engines, V. Ganesan, Tata McGraw Hill Education; 4th edition, 2017.
6. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1.
7. Dr SRN Reddy, Rachit Thukral and Manasi Mishra, "Introduction to Internet of Things: A Practical Approach", ETI Labs.
8. Raj kamal, "Internet of Things: Architecture and Design", McGraw hill.

Introduction to Python Programming

Course title:	Introduction to Python Programming		
Course code:	22PLC25B	CIE Marks	50
Course Type	Integrated	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	3
Total Hours of Pedagogy	40 hours (including lab sessions)	Credits	3

Course objectives:

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

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Apply the basic python language constructs to solve problems.		1,2,3	
CO-2	Write programs using functions		1,2,3	
CO-3	Develop programs for string processing and pattern matching		1,2,3	
CO-4	Interpret the concepts of Object-Oriented Programming as used in Python.		1,2,3	

CO-5	Develop programs for string processing and pattern matching		1,2,3	
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POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level	2	2	2									

Module-1 (08 hours)

Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program.

Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with `sys.exit()`,

Module – 2 (08 hours)

Functions: `def` Statements with Parameters, Return Values and `return` Statements, The Non-Value, Keyword Arguments and `print ()`, Local and Global Scope, The `global` Statement, Exception Handling, A Short Program: Guess the Number

Module-3 (08 hours)

Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References.

Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things

Module-4 (08 hrs)

String Handling: String Literals, Raw Strings, Working with Strings, Indexing and Slicing Strings, Useful String Methods

Pattern Matching with Regular Expressions: Finding Patterns of Text Without Regular Expressions, Finding Patterns of Text with Regular Expressions, Creating Regex Objects, Matching Regex Objects, Grouping with Parentheses, Matching Multiple Groups with the Pipe, Wildcard matching

Module-5 (08 hrs)

Organizing Files: The `shutil` Module, walking a Directory Tree, Compressing Files with the `zipfile` Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File,

Debugging: Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE"s

Programming Exercises:

1. a. Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages.

1. b. Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.
2. a. Develop a program to generate Fibonacci sequence of length (N). Read N from the console.
b. Write a function to calculate factorial of a number. Develop a program to compute binomial coefficient (Given N and R).
3. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.
4. Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.
5. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display dictionary slice of first 10 items]
6. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip (), len(), list methods sort(), append(), and file methods open(), readlines(), and write()].
7. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods.
8. Write a function named DivExp which takes TWO parameters a, b and returns a value c ($c=a/b$). Write suitable assertion for $a>0$ in function DivExp and raise an exception for when $b=0$. Develop a suitable program which reads two values from the console and calls a function DivExp.
9. Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N ($N \geq 2$) complex numbers and to compute the addition of N complex numbers.
10. Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use init() method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display the score card details.]

Textbooks

1. Al Sweigart, "Automate the Boring Stuff with Python", 1st Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at <https://automatetheboringstuff.com/>) (Chapters 1 to 18, except 12) for lambda functions use this link: <https://www.learnbyexample.org/python-lambda-function/>
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at <http://greenteapress.com/thinkpython2/thinkpython2.pdf> (Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

Communicative English

Course title:	Communicative English		
Course code:	22ENG26	CIE Marks	50
Course Type	Theory	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	3
Total Hours of Pedagogy	15	Credits	1

Course objectives:

- 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:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Explain and apply the Fundamentals of Communication Skills in their		10	
CO-2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.		10	
CO-3	Impart basic English grammar and essentials of language skills as per	10		
CO-4	Explain and use all types of English vocabulary and language proficiency.		10	
CO-5	Adopt the Techniques of Information Transfer through presentation.	10		

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level										2.4		

Module-I (3 Hrs)

Introduction to Communicative English: Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective

Communicative English, Different styles and levels in Communicative English.
Interpersonal and Intrapersonal Communication Skills.

Module-II (3 Hours)

Introduction to Phonetics: Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.

Module-III (3 Hours)

Basic English Communicative Grammar and Vocabulary - I: Grammar - Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.

Module-IV (3 Hours)

Basic English Communicative Grammar and Vocabulary - II: Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.

Module-V (3 Hours)

Communication Skills for Employment: Information Transfer: Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises.

Reference Books:

- 1 Communication Skills by Sanjay Kumar & Pushplata, Oxford University Press India Pvt Ltd - 2019
- 2 A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.
- 3 Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
- 4 English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
- 5 English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
- 6 A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press – 2020.
- 7 Practical English Usage by Michael Swan, Oxford University Press – 2016.

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

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

Course Title:	ಬಳಕೆ ಕನ್ನಡ		
Course Code:	22KBK27	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 (22KBK17/27) will enable the students,

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

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 ಸಿಪಿಟಿ 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

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

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

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

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

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

COs and POs Mapping (Samskritika Kannada/ Balake Kannada):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01						3				1		
C02						3				1		
C03						3				1		
C04						3				1		
C05						3				1		

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

Course Title:	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ		
Course Code:	22KSK27	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 ಪುಸ್ತಕ ಆಧಾರಿಸಿ ಬಾಕ್ 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.

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

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

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

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

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)

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

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

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

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

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

Course outcome (Course Skill Set)

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

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

C01	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
C02	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ

	ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸೂರ್ತಿ ಮೂಡುತ್ತದೆ.
C03	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
C04	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕ ಹೆಚ್ಚಾಗುತ್ತದೆ.
C05	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

University Prescribed Textbook :**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ**

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

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

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

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.

COs and POs Mapping (Samskritika Kannada/ Balake Kannada):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						3				1		
CO2						3				1		
CO3						3				1		
CO4						3				1		
CO5						3				1		

Innovation and Design Thinking

Course title:	Innovation and Design Thinking		
Course code:	22IDT29	CIE Marks	50
Course Type	Theory	SEE Marks	50
(Theory/Practical/Integrated)		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	1
Total Hours of Pedagogy	15	Credits	1

Course objectives:

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

Course outcomes:

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Appreciate various design process procedure.			3
CO-2	Generate and develop design ideas through different technique.			3,5

CO-3	Identify the significance of reverse Engineering to understand products.															3,6	
CO-4	Draw technical drawing for design ideas.																3,11

POs	1	2	3	4	5	6	7	8	9	10	11	12
Mapping Level			1		1	1					1	

Module-1(3 hours)

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

Module-2 (3 hours)

Tools for Design Thinking
Real-Time design interaction captures and analysis – Enabling efficient collaboration in digital space– Empathy for design – Collaboration in distributed Design

Module-3 (3 hours)

Design Thinking in IT, Design Thinking to Business Process modelling – Agile in Virtual collaboration environment – Scenario based Prototyping.

Module-4 (3 hours)

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

Module-5 (3 hours)

Design thinking workshop, Design Thinking Workshop Empathize, Design, Ideate, Prototype and Test.

Textbooks:

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

References:

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

CIE and SEE Evaluation (from 2022-23 batch)

CIE for Non-integrated Courses: With LTP 3-0-0 and 4-0-0 or 2-2-0/3-2-0

Two tests + One Improvement tests: (20+20+20 each of one-hour duration)

Two higher scores from three tests are taken representing 40 marks

QP pattern: 3 questions- Q.3 is compulsory and one question to be answered from Q.1 and Q.2, each question can be with maximum of two subdivisions.

CTA: Minimum two components such as assignments, quiz, seminar, written assignment, any technical activity related to course etc. each of 5 marks. Total CTA marks- 10

CIE= 40(from tests) +10(from CTA) = 50 marks

SEE: Exam will be conducted for 100 marks with 3 hours duration and will be scaled down to 50 marks. Five modules with built in choice. Each question can be with maximum of three subdivisions.

CIE for Integrated Courses: With LTP 2-0-2 and 3-0-2 and 2-2-2

Theory CIE component:

Two tests + One Improvement test (20+20+20 each of one hour duration)

Two higher scores from three tests are taken representing 40 marks

QP pattern: 3 questions- Q.3 is compulsory and one question to be answered from Q.1 and Q.2, each question can be with maximum of two subdivisions.

Practical CIE component (CTA): Laboratory component. 5 marks for conduction, regularity, involvement, journal etc. Lab Test -5 marks. A test as per the schedule announced will be conducted at the end for 50 marks and scaled down to 5 marks. 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.

CIE= 40(from tests) +10(from CTA i.e. lab component) = 50 marks

SEE: Exam will be conducted for 100 marks with 3 hours duration and will be scaled down to 50 marks. Five modules with built in choice. Each question can be with maximum of three subdivisions. The questions shall be asked to test practical understanding for maximum of 30 marks.

CIE for AEC/HSMS Courses: With LTP 1-0-0 for 1 Credit

- CIE for 1 credit AEC/HSMS Courses with LTP 1-0-0
- Two tests + One Improvement tests
- 20+20+20 each of one-hour duration
- QP pattern for IA: MCQ 15 questions
- Two higher scores from three tests are taken representing 40 marks
- CTA: Minimum two components such as assignments, quiz, seminar, written assignment, any learning activity related to the course etc. each of 5 marks.
- CIE= 40(from tests) +10(from CTA) = 50 marks
- SEE: Exam will be conducted for 50 marks with 1hour duration. There will be 50 MCQs. The question paper will contain 10 MCQ questions from each module.