BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institute affiliated to VTU, Belagavi)

(Accredited by NAAC with 'A' grade and NBA)

Yelahanka, Bengaluru-560 064

Scheme and Syllabus
(With effect from 2021-22)

Bachelor of Engineering

I & II Semesters

(AI&ML, CV, CSE, EEE, ECE, ETE, ISE, ME)

NOVEMBER 2021

Vision

To emerge as one of the finest technical institutions of higher learning, to develop engineering professionals who are technically competent, ethical and environment friendly for betterment of the society.

Mission

Accomplish stimulating learning environment through high quality academic instruction, innovation and industry-institute interface.

PROGRAM OUTCOMES

Program Outcomes as defined by NBA Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

CONTENTS

DEPARTMENT OF MATHEMATICS
Choice Based Credit System (CBCS)
SEMESTER - I

Calculus and Differential Equations (2:0:1) 3
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21MA11	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:1:1	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3 Hours

Course Objectives:

This course will enable students to:

1. Apply the important tools of calculus and differential equations that are essential in all branches of engineering.
2. Apply partial derivatives to calculate the rate of change of multivariate functions.
3. Analyze various concepts of vector calculus and their physical relevance.

Module – I

Preamble: Understanding the importance of the study of Calculus and its applications in the field of Engineering and Economics.

Differential Calculus: Determination of n^{th} order derivatives of standard functions - Problems. Leibnitz's theorem (without proof)-problems.
Polar curves - Angle between the radius vector and tangent, angle between two curves, Pedal equation of polar curves. Taylor's and Maclaurin's series for a function of a single variable-problems.

Application of Polar curves – Position and Navigation
Self-Learning Component – Determination of n^{th} order derivatives of standard functions (derivation)
Lab Session 1: Demonstrate elementary math functions, Create and work with arrays.

(8 hours)

Module – II

Partial derivatives: Definition and simple problems, Euler's theorem (without proof) – problems, total derivatives, partial differentiation of composite functions-problems.
Definition and evaluation of Jacobians, Taylor's and Maclaurin's series of two variables-problems.

Application – Study of temperature in a moving car
Self-Learning Component – Proof of Euler's theorem.
Lab Session 2: Calculate the value of functions at different points, Using symbolic objects in computations.

(8 hours)

Module – III

Integral Calculus: Reduction formulae - $\int \sin^n x dx,\ \int \cos^n x dx,\ \int \sin^m x \cos^n x dx$

(m and n are positive integers). Evaluation of these integrals with standard limits (0 to π/2) and problems. Leibnitz rule for differentiation under the integral sign.

Applications: Finding the length, area, surface area and volume for Cartesian, polar and parametric curves.

Self-Learning Component – Proof of the reduction formula - $\int \sin^n x\,dx$, $\int \cos^n x\,dx$, $\int \sin^m x \cos^n x\,dx$

(m and n are positive integers).

Lab Session 3: Programming using an array (or matrix). Plot two dimensional Cartesian and polar curves

(8 hours)

Module – IV

Differential Equations: Solution of first order and first degree differential equations –Bernoulli's differential equations, exact, reducible to exact.

Applications: Orthogonal trajectories in Cartesian and polar form. Simple problems on Newton's law of cooling, LR-Circuit, Exponential growth and decay.

Self-Learning Component – Variable separable, homogeneous and linear methods for solving differential equations.

Lab Session 4: Set the line style, marker symbol, colour, label axes with text stringsand title the graph with a text string in graphs, Plot multiple curves in one graph.

(8 hours)

Module – V

Vector Calculus: Derivative of vector valued functions, Velocity, Acceleration and related problems, Scalar and Vector point functions. Unit tangent vector, Unit normal vector. Gradient of a scalar, Divergence of a vector, Directional derivative and Curl of a vector-problems. Solenoidal and Irrotational vector fields. Vector identities – div (ϕ A), div(gradϕ), curl (ϕ A), curl (grad ϕ), div (curl A).

Application- Centre of mass, field theory, kinematics

Self-Learning Component – Derivative of vector valued functions, Velocity, Acceleration and related problems, Unit tangent vector, Unit normal vector.

Lab Session 5: Differentiate symbolic expression or functions of one or several variables with respect to one or more independent variables up to required order.

Summary: The student will be able to analyse and apply various concepts related to vector calculus and differential equations. (8 hours)

Course outcomes:

The students will be able to:

CO1: Apply the knowledge of Calculus to solve problems.

CO2: Apply partial derivatives to calculate rate of change of multivariate functions.

CO3: Apply the concept of integration to evaluate the length of curves, area of plane curves, surface area and volume of solids.

CO4: Analyze and solve first-order ordinary differential equations.

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** First question with 20 MCQs carrying 1 mark each.

• **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions. • **CIE** will be announced prior to the commencement of the course. • 25 marks for test. Average of three test will be taken. • 25 marks for Alternate Assessment Method.	
Text books	
1.	E. Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley & Sons, 2015.
2.	B.S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers, 2015.
3.	N. P. Bali and Manish Goyal, A text book of Engineering Mathematics, 9th ed., Laxmi Publications (P) Ltd., 2014.
References	
1.	Srimanta Pal and Subodh C. Bhunia, Engineering Mathematics, 3rd edition., Oxford University Press, 2016.
2.	B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill, 6th edition, 2010.
3.	H. K. Dass and Er. RajnishVerma, Higher Engineering Mathematics, 1st edition, S. Chand and Company Pvt. Ltd., 3rd edition, 2014.

DEPARTMENT OF PHYSICS
Choice Based Credit System (CBCS)
SEMESTER - I/II

ENGINEERING PHYSICS (3:0:0) 3
(Common to all Branches)
(Effective from the academic year 2021 -2022)

Course Code	21PY12/22	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of contact Hours	40	Exam Hours	3

Course Objectives:
This course will enable students to:

1. Identify the fundamental concepts related to theory of quantum mechanics, oscillations and photonics.
2. Elucidate the significance of materials based on their physical properties.
3. Apply the knowledge in solving the problems on mechanics, photonics and quantum mechanics.
4. Examine the materials properties related to engineering applications.

Preamble: Introduction, Oscillations, Ultrasonics and shock waves - Applications. Materials and EM Waves properties. Quantum Mechanics. Lasers and Optical fibers -Advanced communications and photonics.

Module – 1

Quantum mechanics and Electrical conductivity in Metals

Self-study topics: Dual nature of light and wave particle dualism, Classical free electron theory, Expression for electrical conductivity, Failure of classical free electron theory and basics of quantum mechanics.

Quantum mechanics: Introduction, Heisenberg's uncertainty principle and its significance, application: non-existence of an electron inside the nucleus. Wave functions and its physical significance. Probability density, normalization. Eigen values and Eigen functions, time independent 1-D Schrodinger wave equation and its application: particle in an infinite potential well (derivation), Finite potential well and quantum tunnelling effect (qualitative). Numerical Problems.

Electrical conductivity in metals: Introduction, Quantum free electron theory (QFET), density of states and Fermi-Dirac statistics (qualitative), expression for Fermi energy, Fermi factor at different temperatures. Electrical conductivity and merits of QFET, Numerical problems.

Hands on training topics: - Fermi energy for different metals.

(8 Hours)

Module – 2

Electrical conductivity in Semiconductors and Laser

Self-study topics: Fundamentals of semiconductors, concept of electrons and holes, Concepts of light emission, Ruby laser.

Electrical conductivity in Semiconductors: Introduction, Electrical conductivity in intrinsic semiconductors, expression for electron and hole concentration. Photo-voltaic and LED principle, Hall Effect, expression for Hall voltage in terms of Hall coefficient and its applications. Numerical problems.

Laser: Introduction, Interaction of radiation with matter, Einstein's theory: expression for energy

density, conditions and requisites for lasing action, construction and working of CO_2 and semiconductor diode laser. Engineering applications of lasers, Numerical problems.

Hands on Training topics: - Hall effect measurements, Laser beam characteristics.

(7 Hours)

Module – 3

Maxwell's equations and Optical Fibers

Self-study topics: Fundamentals of vectors, dot and cross product of vectors, line, surface and volume integrals, Total internal reflection, advantages of optical fibre over coaxial metal cable and drawbacks of optical fibres, application of optical fibres in point to point communication.

Maxwell's equations: Introduction, Gradient, divergence, curl and their physical significances. Gauss's divergence and Stoke's theorems (qualitative). Maxwell's equations and their physical significance, Displacement current. Electromagnetic waves (EM): EM wave equations and their solutions in free space, Transverse nature and polarization of EM waves. Numerical Problems.

Optical fibres: Introduction, Acceptance angle, Numerical aperture, modes of propagation and V-number. Types of optical fibres, signal degradation: attenuation and causes for attenuation, expression for attenuation coefficient, dispersion losses: chromatic and waveguide (qualitative). Numerical problems.

Hands on training topics: Divergence and curl visualization, transverse nature of light.
Condition for ray propagation: TIR and fiber losses.

(8 Hours)

Module – 4

Oscillations, Dielectrics and Ultrasonic waves

Self-study topics: Definition of SHM, characteristics, examples and representation of SHM by linear and circular motion, differential equation of SHM. Basics of dielectrics, dipoles, classification of sound waves.

Oscillations: Introduction, free oscillations of simple loaded spring mass system, kinetic and potential energies of loaded spring mass system (qualitative), series and parallel combinations of springs. Theory of damped and forced oscillations. Resonance and its applications. Numerical problems.

Dielectrics: Introduction, Various polarization mechanisms involved in dielectric - Electronic polarization, Ionic polarization, Orientation polarization and Space charge polarization; applications of dielectric materials: Dielectrics in transformers and in microwave heating, Non-linear dielectrics (Piezoelectric effect and pyroelectrics).

Ultrasonic waves: Introduction, Production of ultrasonic by piezo electric method, properties and applications of ultrasonic waves: non-destructive testing of materials.

Hands on training topics: - Springs strength calculation and designing of good springs. Resonance.

(8 Hours)

Module – 5

Crystal structure and Defects, Elastic properties of solids and shock waves

Self-study topics: Basic terminologies and types of crystal structures, fundamentals of elasticity, Hooke's law, stress-strain curve and elastic moduli.

Crystal structure and defects: Introduction, crystal systems, Miller indices, inter-planar spacing, Bragg's law and X-ray Diffractometer, crystal defects – types and its applications, Numerical problems.

Elastic properties of solids: Elastic materials, Poisson's ratio and its limitations, factors affecting elasticity, strain hardening and softening, relations between elastic constants: i) Y, η & σ ii) K, Y & σ and iii) σ, k, η & Y (qualitative). Bending moment of beams, single cantilever: expression for Young's modulus, applications of beams, numerical problems.

Shock waves: Introduction of shock waves, concepts of subsonic, supersonic and hypersonic waves, properties of shock waves, Reddy's shock tube and its characteristics, applications of shock waves: industry and agricultural fields.

Hands on training topics: Structure of NaCl and diamond, single cantilever, Reddy's shock tube. Recap / summary of the course.

(9 Hours)

Course outcomes (CO s):

The students will be able to:

CO1: Apply the principles of quantum mechanics, solid state Physics and electrical conductivity in materials

CO2: Apply the principles of lasers, EM waves, optical fibres, elasticity, waves and oscillations.

CO3: Analyse the optical, mechanical and materials properties for engineering applications

CO4: Evaluating the physical parameters for the related technology.

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** 20 MCQs carrying 1 mark each covering all the modules.
- **Part B:** 80 marks descriptive type questions each full question carries 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be conducted for 50 marks and it will be announced prior to the commencement of the course.
- Three IA test will be conducted for 25 marks. Average of three test will be taken.
- 25 marks for Alternate Assessment Method.

Textbooks:

1. M N Avadhanulu and P G Kshirsagar, "Engineering Physics," S. Chand and company Pvt. Ltd., 11th edition, 2014.
2. R K Gaur & S L Gupta, "Engineering Physics," Dhanpat Rai Publications, 8th edition, 2018.

References:

1. S O Pillai, "Solid State Physics," New Age International publishers, 8th edition, 2017.
2. David Jeffery Griffiths, "Introduction to Electrodynamics", Pearson New International Edition, 4th edition, 2017
3. B B Laud, "Lasers and Non-Linear Optics," New Age International publishers, 3rd edition, 2018.
4. Arthur Beiser, "Concepts of Modern Physics", Tata McGraw-Hill Education, 6th edition, 2010.
5. Resnick, Walker and Halliday "Principles of Physics, Wiley publisher, 10th edition, 2015.
6. Ben G. Streetman, Sanjay Banerjee, "Solid State Electronic Devices" Pearson Prentice Hall, 6th edition, 2010.
7. S. K. Dwivedi, A Textbook of Engineering Physics, I K International Publishing House Pvt. Ltd., 1st edition 2010.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I/II

Elements of Electrical Engineering (2:1:0) 3
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21EE13/23	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	03

Course Objectives:
This course will enable students to:

1. Perform calculations in electrical circuits to analyse the behaviour of the circuit by knowing current, voltage, power, energy and frequency.
2. Understand and identify the wiring system and basic protection scheme of electrical systems for domestic applications.
3. Select the type of generator and motor required for a particular application.
4. Appreciate the importance of transformers in the electrical power system.

Module – 1

Preamble : Significance and Scope of the Electrical Engineering, Importance of the Course in Economic growth of Nation, Impact of the course on Societal Problems/ Sustainable Solutions/ National Economy, Career Perspective, Innovations (Current), Research status/trends.

D. C. Circuits: Introduction, Ohm's Law and Kirchhoff's Laws, analysis of series, parallel and series- parallel circuits excited by independent voltage sources. Power and Energy. Illustrative examples.

Single-phase A.C. Circuits: Introduction, generation of sinusoidal voltage, definition of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities.

Hands-on: Reading colour code and obtaining given effective value of resistance using Standard Value Resistors.

(8 Hours)

Module – 2

Analysis of Single-phase A.C. Circuits: Analysis with phasor diagrams, of R, L, C, R-L, R-C and R-L-C circuits, real power, reactive power, apparent power and power factor. Resonance of Series RLC circuit. Illustrative examples involving series, parallel and series- parallel circuits.

Domestic Wiring: Service mains, meter board and distribution board. Two-way and three-way control of a lamp. Elementary discussion on fuse and Miniature Circuit Breaker (MCB's). Electric shock, precautions against shock –Earthing: Pipe and Plate.

Hands-on: Checking the phase, neutral and earthing points in the switch board using the test lamp/tester/multimeter.

(8 Hours)

Module – 3

Three Phase Circuits: Introduction to three phase systems, Necessity and advantages of three phase systems, generation of three phase power, definition of Phase sequence,

balanced supply and balanced load. Relationship between line and phase values of balanced star and delta connections. Power in balanced three-phase circuits, measurement of power by two-wattmeter method. Illustrative examples.

Synchronous Generators: Introduction, principle of operation. Types and constructional features. EMF equation. Concept of winding factor (excluding derivation of distribution and pitch factors). Illustrative examples on EMF equation.

Hands-on: Identification of various parts of stator and rotor through cut section models of machines.

(8 Hours)

Module – 4

Transformers: Introduction, Principle of operation and construction of single-phase transformers (core and shell types). EMF equation, losses, efficiency and voltage regulation (Open Circuit and Short circuit tests, equivalent circuit and phasor diagrams are excluded). Illustrative problems on EMF equation and efficiency only.

Three Phase Induction Motors: Introduction, Concept of rotating magnetic field. Principle of operation. Types and Constructional features. Slip and its significance. Applications of squirrel - cage and slip - ring motors. Necessity of a starter, star-delta starter. Illustrative examples on slip calculations.

Hands-on: Verification of Primary and Secondary voltages of a Transformer.

(8 Hours)

Module – 5

DC Machines: Introduction, working principle of DC generator. Types and constructional features. EMF equation of generator. Illustrative examples.

DC motor working principle, Back EMF and its significance, torque equation. Types of D.C. motors, characteristics (shunt and series only) and applications. Necessity of a starter for DC motor and three-point starter. Illustrative examples on back EMF and torque, Electric Braking in DC motors.

Self- Study Topics:

Electric Vehicles: Introduction, Components of EV, General layout of EV, Classification, Advantages and Disadvantages of EV

(8 Hours)

Summary: The student will be able to explore Electrical circuits and their behavior with DC and AC supply. Students will be able to evaluate the performance of Electrical machines.

Course outcomes: The students will be able to:

CO1: Comprehend the concepts of domestic wiring and protective devices.

CO2: Apply the fundamental principles of electrical science to know the working of AC and DC machines.

CO3: Analyze DC and AC circuits.

CO4: Analyze the performance of Electrical machines.

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** 20 MCQs carrying 1 mark each covering all the modules.
- **Part B:** 80 marks descriptive type questions each full question carries 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.

- **CIE** will be conducted for 50 marks and it will be announced prior to the commencement of the course.
- Three IA test will be conducted for 25 marks. Average of three test will be taken.
- 25 marks for Alternate Assessment Method.

Textbooks:

1. D.C. Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2nd edition, June 2019.
2. V.K. Mehta, Rohit Mehta, "Principles of Electrical Engineering & Electronics", S. Chand Publications, 2nd edition, 2019.

References:

1. E. Hughes, "Electrical and Electronics Technology", Pearson Education, 12th edition, 2016.
2. S.S. Parker Smith and N.N Parker Smith, "Problems in Electrical Engineering "CBS publishers & Distributors Pvt Ltd, 9th edition, 2018
3. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI learning Private Limited, 2nd edition, 2017.

DEPARTMENT OF MECHANICAL ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I/II

Engineering Graphics (2:0:1) 3
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21ME14/24	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:0:2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:

This course will enable students to:

1. Illustrate skills of visualizing points and lines to represent the same in two dimensions as per international standards, by manual and computational methods.
2. Apply orthographic projections of planes and simple three-dimensional objects.
3. Construct isometric projections of solids and combination of solids

Module – 1

Preamble: Importance of learning Engineering Graphics, Industrial /defence application, research in the field of ME, Impact of the course on societal and sustainable solutions.

Introduction to Engineering graphics

Drawing Instruments and their uses, relevant BIS conventions and standards. Lettering, line conventions, dimensioning, material conventions, and free hand practicing. 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, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz., tangency, parallelism, inclination and perpendicularity.

Orthographic Projections: Planes of projection.

Projections of points in all the four quadrants.

(4 Hours)

Module – 2

Projections of straight lines

True length and True inclinations of a line, Apparent length and apparent inclinations of a line. Projection of straight line inclined to both the planes.

(8 Hours)

Module – 3

Projections of plane surfaces

Introduction to projection of plane surfaces, Projection of Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes inclined to horizontal and vertical planes.

(8 Hours)

Module – 4

Projections of solids

Introduction to projections of Solids, Projections of right regular Prisms, Pyramids, Cones, Tetrahedron and Hexahedron inclined to both the planes.

(12 Hours)

Module – 5

Isometric Projection

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of hexahedron, right regular prisms, pyramids, cylinders, cones, Hemisphere and spheres. Isometric projection of combination of two solids.

(8 Hours)

Course Outcomes (COs):

The students will be able to:

CO1: Illustrate competence in orthographic projections of points and lines.

CO2: Apply the concepts of orthographic projections of planes and solids pertaining to industrial drawings.

CO3: Construct isometric drawings of objects from orthographic views.

Question paper pattern:

- Module I is for understanding the introductory concepts of the course and for practice using the necessary software. This module is not considered for CIE and SEE.
- Module 2 and Module 3 will have ONE question each. Student required to answer any ONE question.
- Module 4 will have TWO questions. Student required to answer any ONE question.
- Module 5 will have TWO questions. Student required to answer any ONE question.

Scheme of Evaluation:

Each of the question will be distributed in to TWO segments. The first being **SKETCHING** to its actual scale in the sketch book followed by the second segment being **DRAFTING** using a relevant Graphics Software.

Q. No	**Question Paper Pattern**	**Marks for SKETCHING**	**Marks for DRAFTING**	**TOTAL MARKS**
1	ONE question each from Module 2 and Module 3	15	10	25
2	TWO questions from Module 4	25	20	45
3	TWO questions from Module 5	20	10	30

CIE Scheme of Evaluation:

Out of the total 50 marks to be evaluated internally,

1. 20 marks to be allotted for the sketchbook(sketching + printout of computer drafts)
2. 15 marks being the average of 2 internals.
3. 15 marks to be allotted to Alternate assessment tools.

Textbooks:

1. K.R. Gopalakrishna, *Engineering Graphics*, 32nd edition. Bangalore: Subhas Publications, 2013.
2. N.D. Bhat
3. Bhatt, *Engineering Drawing*, 48th edition. Gujarat: V. M. Panchal Charutha Publishing House, 2005.

References:

1. A Primer on Computer Aided Engineering Drawing, 2nd edition, Published by VTU, Belagavi.
2. Luzadder Warren J., Duff John M Eastern, 2009, Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, 7th edition, Best Publications.

DEPARTMENT OF CIVIL ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I/II

Elements of Civil Engineering (3:0:0) 3
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21CV15/25	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	03

Course Objectives:

This course will enable students to:

1. Recognize the scope of various fields of Civil Engineering, with respect to society, environment in infrastructure development and sustainability.
2. Analyze the reactions at supports in beams subjected to various loading conditions and to analyze the effect of friction in bodies.
3. Analyze the systems involving Forces and Moments with their applications, Centroid, Moment of inertia, Kinematics and Kinetics of bodies.
4. Comprehend the concept of planning and development of smart cities.

Module – 1

Introduction to Civil Engineering: Scope of interdisciplinary branches in infrastructure development, Relevance of civil engineer for sustainable development of society. Scope of different fields of Civil Engineering, Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering. Infrastructure, Types of infrastructure, Role of Civil Engineer in the Infrastructural Development, Effect of the infrastructural facilities on socio-economic development of a country.

Introduction to Engineering Mechanics: Basic idealizations – Particle, Continuum and Rigid body; Newton's laws, Force and its characteristics, Force Systems - Classification of force systems, Principle of physical independence, superposition, transmissibility of forces. Introduction to SI units. Newton's Laws of Motion, Law of parallelogram of forces, Polygonal law, Resolution and Composition of forces-numerical.

Practical session: Hands on activities on building structural models.

(8 Hours)

Module – 2

Equilibrium of Coplanar Concurrent Force Systems: Principle of resolved parts, Resultant & Composition of coplanar-concurrent force system, Lamis's Theorem, Free body Diagram and related numerical.

Equilibrium of Coplanar Non-Concurrent Force Systems: Varignon's principle of moments, Resultant and Composition of coplanar non-concurrent force system, force couple system.

Supports & Support reactions in Beams: Types of supports, types of beams, & types of loading. Statically Determinate & indeterminate Beams, Related numerical on determinate beams.

Practical session: Hands on session on forces, different supports and loading systems.

(8 Hours)

Module – 3

Centroid: Introduction - computing centroid for– T, L, I and full/quadrant circular sections and their built up sections. Related Numerical.

Moment of Inertia: Introduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem - computing moment of Inertia for – T, L, I and full/quadrant circular sections and their built up sections. Related Numerical.

Friction: Friction on inclined & horizontal planes, Ladder friction. Related numerical.

Practical session: Determining Centroid, MOI and friction for given structural mechanism.

(8 Hours)

Module – 4

Kinematics: Definitions, Displacement, Average velocity, Instantaneous velocity, Speed, Acceleration, Average acceleration, Variable acceleration, Acceleration due to gravity, Newton's Laws of Motion. Rectilinear Motion-Numerical problems. Curvilinear Motion-Super elevation, Projectile Motion, Relative motion, Numerical problems. Motion under gravity, Numerical problems. **Kinetics:** D' Alembert's principle and its applications in plane motion and connected bodies including pulleys.

Practical session: Determining the dynamic properties of a vehicle.

(8 Hours)

Module – 5

Smart Cities: Smart city – Challenges in Urbanization – Features of smart city - Strategic development – Selection process of smart cities - Key outcomes of smart city - Guiding Principles –Structuring of smart city - Smart cities - ecosystem, stakeholders and market dynamics - Smart solutions for smart cities.

Green Building Concept: What is Green Building, Why to go for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, What are key Requisites for Constructing a Green Building, Important Sustainable features for Green Building

Practical session: Case Study/ Report and Seminar.

(8 Hours)

Course outcomes:

The students will be able to:

CO1: Apply the basic concepts of civil engineering for infrastructure development and smart cities.

CO2: Analyze the mechanics under various loading and boundary conditions.

CO3: Design and develop the solution for bodies under static and dynamic conditions.

CO4: Evaluate case studies of real-time problems in civil engineering.

CO5: Identify the recent technological developments in civil engineering.

Teaching Practice:

- Classroom teaching (chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** First question with 20 MCQs carrying 1 mark each.

- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three tests will be taken.
- 25 marks for Alternate Assessment Method.

Alternate Assessment Methods:

→ Any three Alternate Assessment Tool (AAT) from COE suggested list.

Text Books

1. Shesha Prakash M.N and Ganesh. B. Mogaveer, "Elements of Civil Engineering and Engineering Mechanics", PHI Learning, 3rd Revised edition (2014).
2. Russell C Hibbeler and Ashok Gupta (2010), Engineering Mechanics: Statics and Dynamics (11th Edition), Published by Pearson Education Inc., Prentice Hall.
3. Beer, Johnston, Cornwell and Sanghi (2013) Vector Mechanics for Engineers: Statics and Dynamics, 10th Edition, McGraw-Companies, Inc., New York.
4. Bhavikatti, S.S, "Elements of Civil Engineering and Mechanics", New Age International Publisher, 6th edition, 2019.
5. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 4th edition, 2010.
6. Dr N Mani, "N Mani Smart Cities & Urban Development in India", New Century Publications, 12 August 2016.
7. Tomwoolley and Samkimings, "Green Building Hand Book" 2009.

References:

1. Timoshenko and Young, "Engineering Mechanics", McGraw Hill Publishers, 5th edition 2013.
2. Nelson A, "Engineering Mechanics-Statics and Dynamics", Tata McGraw Hill Education Private Ltd, 1st edition, 2009.
3. Smart Cities Mission Statement and Guidelines, Ministry of Urban Development, Government of India, June 2015.
4. Smart Cities in India: Framework for ICT Infrastructure, Telecom Regulatory Authority of India, New Delhi, September 2020.
5. Making a city smart: Learnings from the Smart Cities Mission, Ministry of Housing and Urban Affairs, Government of India, March 2021.
6. Complete Guide to Green Buildings by Trish riley.

DEPARTMENT OF PHYSICS
Choice Based Credit System (CBCS)
SEMESTER - I/II

Engineering Physics Laboratory (0:0:1) 1
(Common for all Branches)
(Effective from the academic year 2021 -2022)

Course Code	21PYL16/26	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:1:2	SEE Marks	50
Total Number of Practical Hours	26	Exam Hours	3

Course objectives:

This course will enable students to:

1. Apply the concepts required for the measurement of physical parameters related to engineering.
2. Demonstrate and construct the electrical, mechanical and optical experiments.
3. Compare and analyze the results of the experiments.
4. Build simple experimental set up and estimate the physical parameters related to engineering.

PART: A Regular Experiments

Sl.No. Title of the experiment

1. Measurement of velocity of ultrasonic waves in liquid medium.
2. Determination of inductance of unknown inductor using LCR series and parallel circuits.
3. Determination of spring constant and to verify laws of combinations of springs by displacement method.
4. Determination of wavelength of laser using laser diffraction.
5. Determination of numerical aperture of an optical fiber.
6. Determination of radius of curvature of a plano convex lens using Newton rings.
7. Determination of rigidity modulus using torsional pendulum method.
8. Determinations of Young's modulus of material of a material by single cantilever method.
9. Determination of Planck's constant using LEDs.
10. Magnetic intensity measurement using current carrying circular coil.

PART: B Open ended experiments (Any 02 experiments)

Sl.No. Title of the experiment

1. Measurement of losses in optical fibers.
2. Magnetic Hysteresis - loop tracing and energy loss estimation.
3. Measurement of slit width, thickness of wire and counting number of slits in grating using Lasers.
4. Determination of thickness of metal strip/paper from interference at an air wedge.
5. Determination of Fermi energy of different metals.
6. Thermal conductivity of materials.
7. Determination of bulk modulus.
8. Determination of wavelength of different LEDs.
9. Divergence of the laser beam.
10. Simulation of electrical experiment using P-spice/ comsol multiphysics software.
    - LCR series and parallel circuits, photo-diode, Zener diode, solar cell etc.

PART: C Demonstration experiments

1. Determination of Mach number using Reddy's shock tube

Course outcomes (CO s):

The students will be able to:

CO1: Applying the knowledge of laws of Physics to engineering problems.

CO2: Analyze the mechanical, optical and electrical properties of the materials.

CO3: Evaluate and interpret the obtained result(s) related to engineering fields

Question paper pattern:

- **SEE** will be conducted for three hours.
- Students has to perform two experiments carrying 50 marks for each which includes write-up, conduction, calculation and viva-voce of that experiment.
- **CIE** will be for 50 marks.
- **Part A**: Conduction of the experiments and submission of record book carries 30 marks and one test will be taken for 10 marks.
- **Part B**: Conduction of the experiments and submission of record book carries 10 marks.

SEE Scheme of evaluation:

The student has to perform TWO experiments during the practical examination of THREE hours duration. The scheme of valuation shall be as follows.

Sl. No.	Description	Max. Marks 100	Part: A Marks for First experiment	Part: B Marks for Second experiment
1.	Write up: Formula, Tabular column and Circuit diagram/Ray Diagram	16	4+2+2=08	4+2+2=08
2.	Experimental set up/Circuit connection	10	5	5
3.	Conduction and reading	40	20	20
4.	Graph, Calculations, Results and accuracy	20	2+4+2+2=10	2+4+2+2=10
5.	Viva-Voce	14	7	7
Total		**100**	**50**	**50**

Textbooks:

1. C L Arora, "B.Sc. Practical Physics", S CHAND and company Ltd. 1st edition 2010.

References:

1. Worsnop and Flint, "Advanced physics practical for students", Metuen and Co, London 2005.
2. D Chattopadhyay and P C Rakshit, "Advanced course in Practical Physics", New central book agency 8th edition, 2013.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I/II

Electrical Engineering Laboratory (0:0:1) 1
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21EEL17/27	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	28	Exam Hours	03

Course Objectives:
This course will enable students to:

1. Control the lamp from different points.
2. Appreciate the significance of protection mechanisms in electrical systems.
3. Measure the electrical parameters in a single phase and three phase ac circuits.
4. Validate the relation between Line and Phase quantities of Star and Delta connected loads.
5. Analyze a given network by applying Kirchhoff's laws.
6. Analyze the behavior of electric circuits under short circuit and open circuit conditions.

PART A

List of the Experiments

1. Verification of Kirchhoff's Voltage Law and Kirchhoff's Current Law for a DC circuit.
2. Determination of earth resistance
3. Study of open circuit and short circuit in simple circuits
4. Two way and three way control of a lamp.
5. Measurement of current, power and power factor of different types of lamps
6. Determination of phase and line quantities in three phase Star and Delta connected Loads and validate the inter-relationship.
7. Measurement of Active and Reactive Power in a balanced Three-phase circuit
8. Measurement of inductance and resistance of a choke coil.

PART B

Open ended experiments

1. Understanding AC and DC supply. Use of tester and test lamp to ascertain the healthy status of mains
2. Use of Analog/Digital Multimeter
3. Demonstration of Fuse and MCB under fault conditions
4. Verification of KCL and KVL using simulation software like PSpice/MATLAB etc.
5. Demonstration of cut sections of AC and DC machines
6. Determination of phase and line quantities in three phase Star connected and Delta connected Loads using C/C++ or any other coding.

Course outcomes: The students will be able to
CO1: Connect the components as per the circuit diagram.
CO2: Measure the circuit parameters as per the experiment's objective.
CO3: Analyze, interpret and document the obtained results
CO4: Function in a team to achieve the objective of the experiment.

Textbooks:

1. D.C. Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2nd edition, June 2019.
2. V.K. Mehta, Rohit Mehta, "Principles of Electrical Engineering & Electronics", S. Chand Publications, 2nd edition, 2019.

References:

1. E. Hughes, "Electrical and Electronics Technology", Pearson Education, 12th edition, 2016.
2. S.S. Parker Smith and N.N Parker Smith, "Problems in Electrical Engineering CBS Publishers & Distributors Pvt Ltd, 9th edition, 2018
3. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI learning Pvt Ltd, 2nd edition, 2017.

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Choice Based Credit System (CBCS)

SEMESTER – I

Technical English – I (0:1:0) 1

(Common to all branches)

(Effective from the academic year 2021-22)

Course Code	21HS18	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:1:1	SEE Marks	50
Total Number of Contact Hours	26	Exam Hours	2

Course Objectives:

This course will enable students to:

1. Demonstrate professional communication skills in the globalized workplace context.
2. Apply functional competence in reading and writing so as to create industry-ready personnel.

Module – 1

Preamble: Relevance of the subject to real-time Global, Economic and Societal Scenario. Need of English language to fetch better job opportunities, and Internships in the current scenario. Importance of good communication to broaden your world.

Introduction to Basic English Grammar : Parts of Speech, Noun and its kinds (with objective type exercises)**,** Pronoun, Verbs, Adverbs, Adjectives (Degree of Comparison), Preposition, Conjunction, Interjection**,** Use of Article, Subject Verb Agreement**,** Kinds and Types of Sentences.

(6 Hours)

Module – 2

Introduction to Phonetics: Received Pronunciation (RP),Sounds (44 sounds) - Vowels, Diphthongs and Consonants (with Phonetic transcriptions),Voice Modulation, Tone and Pitch, Aspiration, Word Accent, Stress, Intonation, Minimal Pairs, Weak and Strong forms of sounds, Silent and Non-silent (sounds) letters, Sounds mispronounced, Syllables and Rhythm, Common Errors in Pronunciation, Various Techniques for Neutralization of Mother Tongue Influence.

(4 Hours)

Module – 3

Vocabulary Building: Synonyms & Antonyms, Prefix & Suffix, Word Formation, Words often confused**,** Homophones & Homonyms**,** One Word Substitutes**,** Abbreviations**,** Idioms & Phrases.

(4 Hours)

Module – 4

Technical Writing: Note Making, arranging the information**,** Paragraph Writing of Business Reports (with outlines points) – describing / defining.

(4 Hours)

Module – 5

Speaking, Writing and Reading Skills: Self-introduction – Personal Information, hobbies, strengths and weaknesses, Paper Presentations with the selected topic, Reading texts from newspapers, short stories:

- Saki HH Munro: 'The Story Teller'
- Alphonse Daudet: ' Monsieur Seguin's Goat'
- Anton Chekov: 'Chameleon'

- Maxim Gorky: ' Pepe'
- Liam O' Flaherty: 'His First Flight'
- R Tagore: 'Wrong Man in Worker's Paradise'
- Katherine Mansfield: 'Garden Party'
- Guy de Maupassant: 'The Necklace'
- R K Narayan: ' Astrologer's Day'
- Kate Chopin: ' The Story of an Hour'

Describing a process, use of sequence words, Vocabulary development,Critical analysis.

(8 Hours)

Course Outcomes:

Students will be able to:

CO1: Apply the basic grammatical components effectively in both written and spoken communication.

CO2: Construct effectively the right pronunciation in real time and business situations.

CO3: Apply functional grammar, reading skills and sub-skills.

CO4: Develop a working knowledge of writing strategies, formats and templates of professional writing

CO5: Formulate well in group discussions and get confidence to face the interviews

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three test will be taken.
- 25 marks for Alternate Assessment Method.

Alternate Assessment Method: Activity Report/Seminar Presentation/ Group Discussion

Textbooks:

1. Meenakshi Raman and Sangeeta Sharma, Technical Communication Principles and Practice**.** Oxford Publications, 2nd Edition, 2011.
2. Sanjay Kumar and Pushpa Lata, Communication Skills. Oxford University Press 2018.

References:

1. M Ashraf Rizvi, Effective Technical Communication**,** McGraw Hill Education (India) Private Limited. 2nd Edition, 2018.
2. Wren & Martin, High School English Grammar & Composition, S. Chand Publisher**,** 2015.

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Choice Based Credit System (CBCS)

SEMESTER – I / II

Yoga (0:0:1) 1

(Common to all branches)

(Effective from the academic year 2021-22)

Course Code	21AE19Y/29Y	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:1:1	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Course Objectives:

This course will enable students to:

1. Understand the importance of practicing yoga in day-to-day life.
2. Appreciate of therapeutic and preventive value of Yoga.
3. Maintain the fitness of Physical, Mental and Spiritual.
4. Develop self-confidence to take up initiatives in their lives.

Module – 1

Introduction to Yoga

Definition and Meaning of Yoga, Aims and Objectives, Historical Development of Yoga, Relevance of yoga in modern age and scope and Misconceptions about yoga, Orientation to Patanjala Yogasutra, Yoga & Psychology, classical and scientific aspects of yoga, Importance of practice yoga, Types of Yoga, Brief Rules, Practical classes.

(04 Hours)

Module – 2

Physical Health:

Introduction, Pre-requisites, **Asana-Standing** - tadasana, uttanasana, virabhadrasana, utthita trikonasana, parivrtta trikonasana, ashta chandrasana, vrksasana, **sitting**- Padmasana, Yoga Mudrasana, Ardha Matsyendrasana, Vajrasana, Paschimottasana, and **supine** – Savasana, Matsyasana, Dhanurasana, Bhujangasana, Pavanamuktasana, Halasana, Benefits. Practical classes. **(06 Hours)**

Module – 3

Inner Engineering & Psychological Health:

Introduction Thought Forms – Love, Generosity, Faithfulness, Charity, Humility, Courage, Compassion, Devotion, Honesty

Breathing Exercise & Pranayama - Nadi Shuddi, Anuloma Viloma, Seetkari, Seetali, Sadanta, Bhastrika, Ujjayi, Moorcha & Plavini, Benefits

Preparation to Meditation & Practical classes. (06 Hours)

Module – 4

Therapeutic Yoga and First Aid: Mudra Forms - Yoga Mudra**,** Aswini Mudra, Maha Mudra, Shanmukhi Mudra, Hasta Mudras & Veepareetha Karani Mudra

Relaxation techniques –Breath Focus, Body Scan, Guided imagery, Mindfulness, Repetitive prayer, Benefits, Practical classes. **(06 Hours)**

Module – 5

Spirituality & Universal Mantra:

Introduction, Being Human, Universal Mantra - **OM**, Universal LOVE, Benefits of practice of Spirituality in day to day life, practical classes. **(04 Hours)**

Course Outcomes:

Students will be able to;

1. Actively participate in yoga and enjoy the competitive spirit, recreation or personal development. (PO-6, PO-8)
2. Promote social integration, develop teamwork capabilities, and improve physical and mental health through Yoga (PO-8, PO-9)
3. Know the Yoga for Self and human resource management (PO-10, PO-12)
4. Evaluate learning intention and processes in Yoga; that learnt through the course. (PO - 12, PO-9)

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools
- Practical Demonstrations

Internal Question paper pattern:

First Internal Assessment is Theoretical Based:

- The question paper will have 20 full 'multiple choice questions' carrying equal marks. Each full question will be for 1 marks.
- The descriptive question paper will have 10 questions carrying equal marks. Each full question will be for 2 marks.

Second Internal Assessment is Practical Exam carries 40 Marks –

Perform any one

- Performing Asana
- Breathing Exercise
- Mudra Postures
- Universal Mantra
- Meditation

Assessment Method:

- 40 Marks – theoretical based – IA Test
- 40 Marks – Practical Based – IA Test
- 20 Marks Alternate Assessment methods (Assignment: Seminar/Case Study).
  Student has to be successfully accomplish an assignment based on beyond curriculum self-study concept; wherein the marks allotted is a maximum of 20.

Textbooks

1.B.K.S Iyengar: **Light on the Yoga sutras of patanjali** (Haper Collins Publications India Pvt., Ltd., New Delhi.)

2.B.K.S Iyengar: **Light on Pranayam**, Great Britain by George Allen & unwin 1981

3.Swami Satyananda Saraswati: **Asana Pranayama Mudra Bandha**, Published by Bihar School of Yoga, ISBN: 978-81-86336-14-4
4.George Feuerstein: The yoga Tradition (Its history, literature, philosophy and practice.)
5. Sri Ananda: The complete Book of yoga Harmony of Body and Mind. (Orient paper Backs: vision Books Pvt.Ltd., 1982.
6. Rajayoga - Swami Vivekananda - Ramakrishna Ashrama Publications.
7.Science of Divinity and Realization of Self – Vethathiri Publication, (6-11) WCSC, Erode

References

1. Basavaraddi I V : **Yoga in School Health**, MDNIY New Delhi, 2009
2. Dr. HR. Nagendra: **Yoga Research and applications** (Vivekanda Kendra Yoga Prakashana Bangalore)
3. Dr. Shirley Telles: **Glimpses of Human Body** (Vivekanda Kendra Yoga Prakashana Bangalore
4. S S Hiremath, **Yogamruta,** Shiva Parvati Prakashana, Gadag (Kannada Version)
5. Principles and Practice of Yoga in Health Care, Publisher: Handspring Publishing Limited, ISBN: 9781909141209, 9781909141209

DEPARTMENT OF PHYSICAL EDUCATION AND SPORTS

Choice Based Credit System (CBCS)

SEMESTER – I / II

Sports (0:0:1) 1

(Common to all branches)

(Effective from the academic year 2021-22)

Course Code	21AE19/29 S	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:1:1	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Course Objectives:

This course will enable students to:

1. Healthy life Style.
2. Knowledge about the sports and games.
3. Focus on modern technology in sports.

Module – 1

Introduction of the game: Brief history of the game, Nature of the game & terminology, Present trend of the game, Motor Fitness tests & Skill and Game Performance.

(05 Hours)

Module – 2

Offensive and Defensive Techno Tactical Abilities: Fitness, Fundamentals & Techniques of the game with the implementation of Biomechanics, Tactics –Drills for the Techno Tactical abilities, Individual and Group, Miner games- to implement the Techniques, Tactics and Motor abilities.

(05 Hours)

Module – 3

Team tactics and Rules of the Game: Rules and Regulations of the Game: Game rules as well as sequence of officiating, Team tactics: Offensive and Defensive team strategies and scrimmages, Practice Matches: among the group, Analysis of Techno Tactical abilities: Correction and Implementation of skills and Sports Injuries and rehabilitation: First aid, PRICE treatment.

(05 Hours)

Module – 4

Sports Training: Introduction of Sports Training, Principles of Sports performance, how to increase and sustain the sports performance, Training Load & Recovery –How to increase the training load (Volume/Intensity) and means and methods for Recovery, Periodization: Shorts, Medium and Long term, Physiological changes: Changes in Lung capacity, heart beats etc…

(06 Hours)

Module – 5

Event Organization: Planning and Preparation for the competition, Ground preparation and Knowledge about equipments, Fixtures, Preparation of Inauguration and closing function and Organizing Competition.

(05 Hours)

Course outcomes:

The students will be able to:

CO1: Inculcates healthy habits – i. Daily exercise for fitness, ii. Self-hygiene, iii. good food habits, iv. Create Awareness of Self-assessment of fitness.

CO2: Develop individual and group techno tactical abilities of the game.

CO3: Increase the team combination helps to understand the and plan the startegies to play against the opponents.

CO4: Outline the concept of sports training and how to adopt technology to attain high level performance.

CO5: Summarize the basic awareness of organising sports events and concept of technology implemented to organise competitions in an unbiased manner.

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Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Practical classes in outdoor and indoor as per requirement.

CIE: 100 Marks

- **CIE 1** for 50 marks – A theory paper which is MCQ / Descriptive conducted during the semester
- **CIE 2** for 50 marks – A practical test conducted at the end of the semester in which the students has to be conducted fitness and skill tests and also the assessment of game performance.

Alternate Assessment Methods:

Assignment: Practical assignments will be given to improve fitness as well as skill performance and writing a detailed report on the same or preparing the workout chart etc…

Textbooks

1. Barbara Bushman, "ACSM's complete guide to Fitness & Health", 2011, Human Kinetics USA
2. Pankaj Vinayak Pathak, "*Sports and Games - Rules and Regulation*", 2019, Khel Sahitya Kendra.
3. Hardayal Singh, *"Sports Training, General Theory & Methods"***,** 1984 "Netaji Subhas, National Institute of Sports".
4. Keith A. Brown, "International Handbook of Physical Education and Sports Science", 2018, (5 Volumes) Hardcover.

References

1. Tudor O Bompa, *"Periodisation Training for Sports*", 1999, Human Kinetics, USA
2. Michael Boyle, "New Functional Training for Sports" 2016, Human Kinetics USA
3. Michael Kjaer, Michael Rogsgaard, Peter Magnusson, Lars Engebretsen & 3 more, "Text book of Sports Medicine: Basic Science and Clinical Aspects of Sports Injury and Physical Activity", 2002, Wiley Blackwell.
4. Scott L. Delp and Thomas K. Uchida, "Biomechanics of Movement: The Science of

Sports, Robotics, and Rehabilitation", 2021, The MIT Press

5. MCARDLE W.D. "Exercise Physiology Nutrition Energy And Human Performance" 2015, LWW IE (50)

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
Choice Based Credit System (CBCS)
SEMESTER – I/II

NCC (0:0:1) 1
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21AE19/29N	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:1:1	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Course Objectives:

This course will enable students to:

1. Understand the vision of NCC and its functioning.
2. Understand the security set up and management of Border/Coastal areas.
3. Acquire knowledge about the Armed forces and general awareness.

Module – 1

Introduction to National Cadet Corp: What is NCC, who can join NCC, benefits, Establishment, history, 3 wings, motto, core values, Aims, flag, song, pledge, cardinals, Organization, Director General NCC, Directorates, Uniform and Cadet ranks, Camps, Certificate exams, Basic aspects of Drill

National Integration: Importance of national integration**,** Factors affecting national integration, Unity in diversity**,** Role of NCC in nation building.

Disaster Management: What is a Disaster**,** Natural and Man-made disasters**,** Earthquake, Floods.

(4 Hours)

Module – 2

Indian Army: Introduction to Indian Army, Command and control, Fighting & supporting arms**,** Rank structure, Major Regiments of the Army**,** Major Wars and Battles**,** Entry to the Indian Army, Renowned leaders and Gallantry Awardees.

(02 Hours)

Module – 3

Indian Air Force: Introduction to Indian Air Force, Command and control**,** Rank structure**,** Major Aircrafts, Major Wars and Operations, Entry to the Indian Air Force, Renowned leaders

Indian Navy: Introduction to Indian Navy, Command and control, Rank structure, Major Ships and Submarines, Major Wars and Operations**,** Entry to the Indian Navy, Renowned leaders

(04 Hours)

Module – 4

Health and Hygiene : First Aid Protocols, Self-defence, Fire Fighting

Field & Battle Crafts : Field Signals using hands, Judging distance, Section formations

(10 Hours)

Module – 5

Drill Practicals: Savdhan, Vishram, Salute, Turning, Marching.

(06 Hours)

Course outcomes:

The students will:

CO1: Develop qualities like character, comradeship, discipline, leadership, secular outlook, spirit of adventure, ethics and ideals of selfless service.

CO2: Get motivated and trained to provide leadership in all walks of life and be always available for the service of the nation.

CO3: Be aware on the issues related to conservation of environment, social & community development and disaster management and equipped themselves to provide solutions.

CO4: Get an insight into the defence forces and further motivate them to join the defence forces.

Teaching Practice:

- Blackboard / Multimedia Assisted Teaching.
- Class Room Discussions, Brainstorm Sessions, Debates.
- Activity: Organising/Participation in Social Service Programs.
- On Ground: Drill training.

Internal Question paper pattern:

First Internal Assessment is Theoretical Based carries 40 Marks:

- The question paper will have 20 full 'multiple choice questions' carrying equal marks.

Each full question will be for 1 mark.

- The descriptive question paper will have 10 questions carrying equal marks. Each full question will be for 2 marks.

Second Internal Assessment is Practical Exam carries 40 Marks – Perform Drill

Assessment Method:

- 40 Marks – theoretical based – IA Test
- 40 Marks – Practical Based – IA Test
- 20 Marks Alternate Assessment methods (Assignment: Seminar/Case Study).

Student has to be successfully accomplish an assignment based on beyond curriculum self-study concept; wherein the marks allotted is a maximum of 20

Textbooks:

1. NCC Cadets Handbook – Common, Directorate General of NCC, New Delhi.
2. NCC Cadets Handbook – Special (A), Directorate General of NCC, New Delhi.

References:

1. Chandra B. Khanduri, "Field Marshal KM Cariappa: a biographical sketch", Dev Publications, 2000.

2. Gautam Sharma, "Valour and Sacrifice: Famous Regiments of the Indian Army", Allied Publishers, 1990.

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
Choice Based Credit System (CBCS)
SEMESTER – I / II

Music (0:0:1) 1
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21AE19/29M	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:1:1	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Course Objectives:
The course will enable the students to:
1. Identify the major traditions of Indian music, both through notations and aurally
2. Analyse the compositions with respect to musical and lyrical content
3. Demonstrate an ability to use music technology appropriately in a variety of settings.

Module – 1

Preamble: Contents of the curriculum intend to promote music as a language to develop an analytical, creative, and intuitive understanding. For this the student must experience music through study and direct participation in improvisation and composition.
Origin of the Indian Music: Evolution of the Indian music system, Understanding of Shruthi, Nada, Swara, Laya, Raga, Tala, Mela

(03 Hours)

Module – 2

Compositions: Introduction to the types of compositions in Carnatic Music - Geethe, Jathi Swara, Swarajathi, Varna, Krithi, and Thillana, Notation system.

(03 Hours)

Module – 3

Composers: Biography and contributions of Purandaradasa, Thyagaraja, Mysore Vasudevacharya.

(03 Hours)

Module – 4

Music Instruments: Classification and construction of string instruments, wind instruments, percussion instruments, Idiophones (Ghana Vaadya), Examples of each class of Instruments

(03 Hours)

Module – 5

Abhyasa Gana: Singing the swara exercises (Sarale Varase Only), Notation writing for Sarale Varase and Suladi Saptha Tala (Only in Mayamalavagowla Raga), Singing 4 Geethe in Malahari, and one Jathi Swara, One krithi in a Mela raga

(14 Hours)

Course Outcomes (COs):
The students will be able to:
CO1: Discuss the Indian system of music and relate it to other genres (Cognitive Domain)
CO2: Experience the emotions of the composer and develop empathy (Affective Domain)

CO3: Respond to queries on various patterns in a composition (Psycho-Motor Domain)

Teaching Practice:

- Classroom teaching
- ICT – PowerPoint Presentation
- Audio & Video Visualization Tools

CIE: 100 Marks

- **CIE 1** for 50 marks – A theory paper which is MCQ / Descriptive conducted during the semester
- **CIE 2** for 50 marks – A practical test conducted at the end of the semester in which the student has to recite one Sarale Varase mentioned by the examiner in three speeds. Sing / Play the Geethe in Malahari. Singing / Playing Jathi Swara / Krithi.

Alternate Assessment Methods

Assignment: Attending a classical music concert and writing a detailed report on the same.

Textbooks

1. Vidushi Vasantha Madhavi, "Theory of Music", Prism Publication, 2007.
2. T Sachidevi and T Sharadha (Thirumalai Sisters), Karnataka Sangeetha Dharpana - Vol. 1 (English), Shreenivaasa Prakaashana, 2018.

References

1. Ethel Rosenthal, "The Story of Indian Music and Its Instruments: A Study of the Present and a Record of the Past", Pilgrims Publishing, 2007.
2. Lakshminarayana Subramaniam, Viji Subramaniam, "Classical Music of India: A Practical Guide", Tranquebar 2018.
3. R. Rangaramanuja Ayyangar, "History of South Indian (Carnatic) Music", Vipanci Charitable Trust; Third edition, 2019.
4. Carnatic Music, National Institute of Open Schooling, 2019.

DEPARTMENT OF CHEMISTRY
Choice Based Credit System (CBCS)
SEMESTER – I/II

Engineering Chemistry (3:0:0) 3
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21CH12/22	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:

This course will enable students to:

1. To identify various sustainable technologies in engineering applications.
2. To develop problem solving, critical thinking and analytical reasoning towards scientific problems.
3. To distinguish the use of smart materials for latest development in material research.
4. To appraise the significance of engineering chemistry for industrial and domestic applications.

Module – 1

Preamble: Relevance of chemistry in day today activities, Importance of materials in industrial, defence and research application and its economic implications. Influence of new materials for the technological development, study and use of environment friendly materials for healthier society.

Electrochemistry and Storage devices: Introduction, Single electrode potential & EMF, derivation of Nernst equation for single electrode potential, numerical problems on E_{cell}. Concentration cell. Types of Electrodes: Reference electrodes with example and Ion-selective electrode: Glass electrode. Construction, working and determination of pH using glass electrode.

Electrochemical sensors: Definition, broad classification of electrochemical sensors and its applications.

Batteries- Classification of batteries – Primary, secondary and reserve batteries. Construction, working and applications of metal - air (Zn- air) battery and Li-ion Battery.

Fuel Cells: Introduction, difference between conventional cell and fuel cell, limitations & advantages. Construction & working of H_2-O_2 fuel cell.

Self- Study: Concept of Electrochemical Cell and more numerical on E_{cell}. SHE and Calomel Electrode. Characteristics of a battery: cell potential, current, capacity, electricity storage density, energy efficiency, cycle life and shelf life. Solid- Oxide fuel cell.

(8 Hours)

Module – 2

Corrosion Science: Introduction to corrosion. Consequences of corrosion, Types of Corrosion: Chemical and electrochemical corrosion, differential metal corrosion, differential aeration corrosion (waterline and pitting corrosion). Factors affecting corrosion: Nature of metal, nature of corrosion product, ratio of anodic area to cathodic area, nature of environment (pH, temperature, conductivity). Corrosion control: Cathodic protection- Sacrificial anode method

and Impressed current method. Protective metal coatings – Cathodic and Anodic coatings- Galvanization and Tinning.

Electroplating: Principle. Electroplating of Chromium- Hard and Decorative Cr plating. Electroless plating: Principle. Electroless plating of copper.

Self-study: Technological importance of metal plating. Differences between electroplating and electroless plating.

(8 Hours)

Module – 3

Chemical Fuels and Alternative Fuels: Introduction, Characteristics of a good fuel, Calorific value- gross and net calorific values, determination of calorific value of a fuel using Bomb calorimeter, numerical problems. Petrol knocking: Mechanisms and adverse effects. Anti-knocking agents: Leaded and Unleaded petrol.

Alternate Fuels: Power alcohol: advantages and disadvantages. Biodiesel: Synthesis, advantages and disadvantages.

Solar energy – Introduction, Types of solar energy conversion. Properties of Silicon – Production of Solar grade Silicon from Quartz. Construction and working of Photovoltaic cells.

Self-Study: Reforming of petrol, Synthetic Petrol manufacturing. Knocking in Diesel engine, Octane number and Cetane number.

(8 Hours)

Module – 4

Smart Materials for Engineers:

Smart Materials: Introduction – Types of smart materials, self-healing materials, shape memory alloys and uses of smart materials.

Nanomaterials: Introduction to Nanomaterials, classification and properties. Chemical synthesis of nanomaterials: top-down and bottom-up approach. Synthesis techniques: Sol-gel method, Chemical Vapour Deposition. Applications of nanomaterials in nano-electronics and waste-water treatment.

Self- Study: Applications of nanomaterials in various industries. Carbon nanowires, nanotubes, nanocomposites and Graphene.

(8 Hours)

Module – 5

Air and Water Analysis (Hands-on Session): Water analysis techniques like Hardness of water by EDTA method, Alkalinity of water, Determination of sulphate and chloride by gravimetric method, sodium and potassium by Flame photometry. Chemical & Biological oxygen demands (COD and BOD); Definition, significance and determination of COD & BOD. Water softening by ion-exchange resin. Sewage water treatment by primary, secondary and tertiary process.

Causes, effects and impressive solutions for air pollution (Oxides of carbon, sulphur, nitrogen and hydrocarbon; metals including mercury and lead).

(8 Hours)

Course outcomes:

The students will be able to:

CO1: To identify various sustainable technologies in engineering applications.

CO2: To develop problem solving, critical thinking and analytical reasoning towards scientific problems.

CO3: To distinguish the use of smart materials for latest development in material research

CO4: To appraise the significance of engineering chemistry for industrial and domestic applications.

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three test will be taken.
- 25 marks for Alternate Assessment Method.

Textbooks:

1. Jain, P. C. and Jain, M. "Engineering Chemistry (For VTU)", Dhanpat Rai & Sons, Delhi, 43rd Edition, 2018.
2. O.G. Palanna. "Engineering Chemistry", Tata McGraw Hill Education, Pvt. Ltd, New Delhi, 4th Edition, 2015.

References:

1. Kent, J. A. "Riegel's Handbook of Industrial Chemistry", CBS Publishers New Delhi, 11th Edition, 2003.
2. P.W. Atkins. "Physical Chemistry"**,** Oxford publishers, 8th Edition, 2006.
3. Gowariker, V. R.; Viswanathan, N. V. & Sreedhar, J. "Electrochemical Methods", New Age International (P) Ltd. Pub., 3rd Edition, 2015.

All Engineering Departments
Choice Based Credit System (CBCS)
SEMESTER - I/II

Design Thinking and Innovation (0:1:0)1
(Common to all Branches)
(Effective from the academic year 2021 -2022)

Course Code	21AE110/210	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:2:0	SEE Marks	-
Total Number of Lecture Hours	26	Exam Hours	-

Course objectives:

This course will enable students to:

1. Demonstrate the concept of design thinking for real world problems.
2. Illustrate empathetic design for potential customers.
3: Examine the problem based on user's requirements.
4: Apply creative process and principles products and services
5: Develop problem solving techniques for innovative products and services.

Module – 1

Introduction to Design Thinking: Introduction, Importance of design thinking.
What is Design Thinking**:** Principles of design thinking, The Process of Design Thinking**,** how to plan a Design Thinking project? Case studies on design thinking projects
How to understand the problem: Search field determination, problem classification, understanding of the problem, Problem analysis: PESTEL-Analysis. Analysing the cause of the problem: Ishikawa diagram. Reformulation of the problem. (6Hours)

Module – 2

How to Observe: Observation Phase, Empathetic design, Tips for observing, Method for Empathetic Design: Artifact analysis, Behavioural Mapping and Tracking, Empathy Map, Heuristic Evaluation, Customer Journey, Critical-Incident Techniques**.** Case studies on Empathetic design. (5Hours)

Module – 3

How to Define the Problem: Point-of-view phase, Characteristics of target group, Persona, Benefits of Persona Techniques. Description of customer needs: Jobs-to-be done: Functional Jobs, Social Jobs, Personal Jobs. Identify customer segments and jobs. Means-end approach. Case studies on persona techniques.
How to find and select ideas: Ideate Phase, The creative process and principles. Creative principles: Principle of decomposition, association, analogy & confrontation and abstraction & imagination. Success factor for creative process. (5Hours)

Module – 4

Creative Techniques: Intuitive creative techniques: Brainstorming, Semantic intuition, Provocation technique.
Systematic Analytical Techniques (SAT): Osborn Checklist, Mind Mapping, Synectics, and Morphological box.
Systematic Inventive Thinking (SIT): Method of subtraction, division, multiplication and unifying Function.

Evaluation of ideas: Checklists/Proc-Cons lists, PPCO method, SWOT analysis. Case studies on creative techniques**.**

(5 Hours)

Module – 5

Theory of Inventive Problem Solving Principle: Principle of evolution, innovation checklist, resource analysis and separation principles**.**
Innovation Principles: Principles of decomposition & segmentation, separation, local optimisation, combination, multi-functionality and substitution.
Prototype and Testing: Fundamentals of prototype phase, Test Phase, tips for prototype testing. How to implement Design Thinking: Material Requirements, Agility for design thinking. Case studies on innovation. **(5Hours)**

Course Outcomes: The students will be able to:

CO1.Demonstrate the concept of design thinking for real world problems.
CO2. Illustrate empathetic design for potential users.
CO 3. Examine the problem based on customers' requirements.
CO4. Apply creative process and principles for products and services
CO5. Choose problem solving techniques for innovative products.

CIE Pattern (100 marks):
The evaluation is continuous throughout the semester.

Textbook:

1. Christian Mueller-Roterberg, Handbook of Design Thinking, Tips & Tools for how to design thinking, Kindle Direct Publishing, 2018.

References:

1. A Nil Hasso Plattner, Christoph Meinel and Larry Leifer (, Design Thinking: Understand – Improve – Apply, Springer, 2011

2. Idris Mootee, Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School, John Wiley & Sons 2013.
3. Jeanne Liedtka , Andrew King , Kevin Bennett, Solving Problems with Design Thinking - Ten Stories of What Works ,Columbia Business School Publishing, 2013
4. Gavin Ambrose Paul Harris, Basics of Design Thinking, AVA Publishing, Switzerland, 2009

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – I / II

C Programming for Engineers (2:0:2) 4

(Common to all Branches)

(Effective from the academic year 2021 -2022)

Course Code	21CS13/23	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:0:4	SEE Marks	50
Total Number of Contact Hours	26(L)+52(P)	Exam Hours	3

Course objectives:

This course will enable students to:

1. Familiarize the design of algorithms and flow charts, understanding the fundamentals of C and philosophy of problem solving.
2. Apply basic data types and C programming constructs to solve the problems.
3. Develop debugging skills using Code Blocks/GCC/Gdb.
4. Use derived data types like arrays, strings, structures, and pointers to implement C programs for solving problems.

Module – 1

Preamble: The course is designed to provide complete knowledge of C language for engineering students. C has a rich library which provides a number of built-in functions. It is a highly efficient language to implement algorithms and data structures swiftly, facilitating faster computations in programs. Riding on these advantages, C language has become available on a very wide range of platforms, from embedded microcontrollers to super computers.

Introduction: Algorithms, Flowcharts, Significance and scope of C Programming, Basic Structure of a C Program, Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables.

Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Operator Precedence and Associativity, Arithmetic Expressions, Evaluation of Expressions, Type Conversion in Expressions.

Demonstration/Practice of programs in Operators and Expressions topics.

(5 + 10 Hours)

Module – 2

Input-Output Operations: Introduction, Reading a character, Writing a Character, Formatted Input, Formatted output.

Decision Making, Branching and Looping: Introduction, Decision making with if statement, Simple if statement, if...else statement, Nesting of if...else statements, The else if ladder, The switch Statement, The ? : Operator, The goto statement, The while statement, The do while statement, The for statement, Jumps in loops.

Demonstration/Practice of programs in Decision Making, Branching & Looping topics.

(5 + 10 Hours)

Module – 3
Arrays: Introduction, One dimensional Arrays, Declaration of One dimensional Arrays, Initialization of One dimensional Arrays, Two dimensional Arrays, Initializing Two dimensional Arrays, Multi-dimensional Arrays. **Structures and Unions:** Introduction, Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure Variables, Operations on individual members, Arrays of Structures, Arrays within Structures, Structures within Structures, Unions. **Demonstration/Practice of programs in Arrays, Structures and Unions topics.** (6 + 10 Hours)
Module – 4
User Defined Functions: Introduction, Need for user defined functions, A multi-function program, Elements of user defined functions, Definition of Functions, Return values and their types, Function calls, Function declaration, Category of Functions, No arguments and no return values, Arguments but no return values, Arguments with return values, No arguments but returns a value, Functions that returns multiple values, Nesting of functions, Passing arrays to functions, Passing strings to functions, The scope, Visibility and Lifetime of Variables, Storage classes. **Demonstration/Practice of programs in User defined Functions topics.** (5 + 12 Hours)
Module – 5
Strings: Introduction, Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic operations on characters, Putting strings together, Comparison of two strings, String Handling Functions, Table of strings. **Pointers:** Introduction, Understanding Pointers, Accessing the address of a Variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Increments and Scale Factor, Pointer and Arrays, Pointers and Character Strings, Pointers as Function Arguments, Functions returning Pointers, Pointers to Functions, Structures and Functions. **Recap/Summary of the Course** **Demonstration/Practice of programs in Strings and Pointers topics.** (5 + 10 Hours)
Course Outcomes: The student will be able to: CO1: (K2) Explain the usage of various C programming constructs. CO2: (K3) Apply the knowledge of C programming to build solutions to the given problem. CO3: (K4) Analyze the behavior of programs involving C programming constructs. CO4: (K5) Determine appropriate programming constructs and logic to solve the problems. CO5: (K6) Design the program using the concept of modularity to solve a given

Assessment Patterns: Both CIE and SEE have equal (50:50) weightage.

- **CIE (50 marks)**
  1. Average of three test (25)
  2. Alternative Assessment Tool (25)
- **SEE(50 marks)**

Question paper pattern:

1. 20 MCQs, carrying 1 mark each.
2. The question paper will have ten (descriptive) questions.
3. Each full question consisting of 16 marks.
4. There will be 2 full questions (with a maximum of three sub questions) from each module.
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer all MCQs and 5 full questions, selecting one full question from each module.

Textbooks:

1. E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill, 8th edition, 2019.
2. Brian W. Kernighan and Dennis Ritchie, T0he C Programming Language, Pearson Education Limited, 2nd Edition, 1998. (Chapter-2: Types, Operators and Expressions)

References:

1. Behrouz A. Forouzan and Richard F. Gilberg, Computer Science: A Structured Approach Using C, Cengage Learning, 3rd edition, 2013.
2. Yashavant P. Kanetkar, Let Us C, BPB Publications, 15th edition, 2017.
3. Herbert Schildt, C: The Complete Reference, McGraw Hill Education; 4th edition, 2017.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER - I/II

Basic Electronics Engineering (2:1:0) 3
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21EC14/24	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	03

Course objectives:

This course will enable students to:

1. Understand the operation and characteristics of semiconductor devices.
2. Apply the concepts in the design of analog and digital circuits.
3. Analyze the fundamentals of Digital Electronics and Communication systems.
4. Develop the Electronic systems for real life applications.

Module – 1

Preamble: Evolution of electronics, industrial development, research, impact of electronics on society and its economic growth, scope and career prospective in the field of electronics.

P-N junction diode and applications: Diode operation(Forward and Reverse bias), Voltage-Current(V-I) characteristics of diode, diode models, Rectification-Half wave rectifier, Full wave rectifier, Bridge rectifier: Working and parameters-ripple factor, efficiency, peak inverse voltage, Capacitor filter circuit.

Special purpose diodes: Zener Diode-Characteristics, Zener diode application as a voltage regulator. Light Emitting Diode (LED) -operation and applications.

Self-study: Principles of Semiconductors -Definition, types of semiconductors and Characteristics.

(08 Hours)

Module – 2

Bipolar Junction Transistor and Applications (BJT): Construction, operation and parameters. BJT Common Base, Common Emitter and Common Collector configurations. BJT biasing, operating point, Biasing circuits –Voltage divider bias**.** BJT as an amplifier-CE amplifier. BJT as a switch, Transistor switch circuit to switch ON/OFF an LED and a lamp in a power circuit using a relay.

Metal Oxide Semiconductor FET: Depletion and Enhancement type MOSFET-Construction, Operation, Characteristics and Symbols, CMOS as an inverter.

Self study: Biasing circuits-Self bias, fixed bias, Field Effect Transistor(FET)-Construction, Operation, Characteristics and Symbols

(08 Hours)

Module – 3

Operational amplifiers: Introduction to Op-Amp, Op-Amp Parameters, Applications of Op-Amp -Inverting amplifier, Non-Inverting amplifier, Summer, Voltage follower, Integrator, Differentiator, Comparator.

Feedback: Feedback concepts, feedback connection types, Voltage series feedback, Gain stability with feedback.

Positive feedback: Barkhaunsen's criteria for oscillation .Sinusoidal Oscillators - RC Phase Shift oscillator, Wien Bridge oscillator, Hartley, Colpitts and Crystal oscillator (qualitative approach).

(08 Hours)

Module – 4

Communication System: Introduction, Elements of Communication Systems, Basics of wireless communication systems and Cellular communication.

Digital Electronics: Boolean algebra, Basic and Universal Gates, Combinational circuits: Half and Full adder, Multiplexer, Decoder.

Transducers: Strain gauge, Linear Variable Differential Transducer (LVDT), Piezoelectric transducer.

Electronic Instruments: Oscilloscope, Displaying a waveform in Oscilloscope, Digital Multimeter**.**

Self study: Difference between analog and digital signals, Number System representation and conversion -Decimal, Binary, Octal and Hexadecimal from one system to the other.

(08 Hours)

Module – 5

Applications of Electronic systems

1. Green tech application: Wind turbine for small power application.
2. Liquid level control system.
3. pH neutralization system for waste water treatment.
4. RFID system.

Recap/Summary of the Course

(08 Hours)

Experiments(Hardware/Simulation):

The students are required to

1. Develop and test a basic regulated power supply .An integrated circuit 3–terminal voltage regulator is to be used for regulation.
2. Analyse the characteristics of a Bipolar Junction Transistor as a switch.
3. Design and develop RC phase shift oscillator for the given frequency.
4. Design an integrator/Differentiator circuit using IC 741.
5. Analyse the characteristics of LDR and Photo diode and develop a circuit to turn on an LED using LDR

Course outcomes:

The students will be able to:

CO1: Apply the knowledge of basics of semiconductor devices to build electronic circuits.

CO2: Analyse the working of analog and digital circuits for any application.

CO3: Design electronic systems using analog and digital devices.

CO4: Demonstrate (Hardware/Simulation) the basic applications of electronic circuits in a team.

Question paper pattern:

SEE will be conducted for 100 marks.

- Part A: First question with 20 MCQs carrying 1 mark each.
- Part B: Each full question is for 16 marks. (Answer five full questions out of 10 question with intra modular choice).

a. There will be a maximum of three sub-questions from each module.

b. There will be a choice from two full questions from each module.

CIE will be conducted for 50 marks

- Average of three Internal assessment tests for 25 marks
- Lab experiments(Hardware/Simulation) - 05 marks
- Mini project(Tool based) -15 marks
- Assignment - 05 marks

Textbooks:

1. Thomas L. Floyd., "Electronics Devices",10th Edition, Pearson Education,2008.
2. John M. Yarbrough.,"Digital Logic -Applications and design", 10th Edition, Cengage Learning, 2012.
3. D. P. Kothari, I. J. Nagarath., "Basic Electronics", 2nd Edition, McGraw-Hill Education, 2018.

References:

1. David A. Bell.," Electronic devices and circuits", 5th Edition ,Oxford university press, 2008.
2. Louis Nashelsky and Robert Boylestad., "Electronic Devices and Circuit Theory", 11th Edition, Pearson Education, 2013.
3. Albert Malvino and David J Bates., "Electronic principles", 8th Edition, McGraw-Hill Education, 2015.
4. Theodore Rappaport., "Wireless Communications: Principles and Practice"2nd Edition, Pearson Education, 2010.

DEPARTMENT OF MECHANICAL ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I/II

ELEMENTS OF MECHANICAL ENGINEERING (2:1:0) 3
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21ME15/25	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:
This course will enable students to:
1. Identify different sources of energy and their conversion process.
2. Explain the working principle of hydraulic turbines, IC engines, EV's and refrigeration.
3. Understand the properties of common engineering materials and their applications in engineering industry.
4. Recognize various metal joining processes and power transmission elements.
5. Discuss the working of conventional machine tools, machining processes, tools and accessories.
6. Describe the advanced manufacturing systems and robotics.

Module – 1

Preamble: Importance of Mechanical Engineering in the current scenario, industrial /defence application, research in the field of Mechanical Engineering, impact of Mechanical Engineering on societal and sustainable solutions.
Sources of Energy: Renewable and non-renewable energy sources, environmental issue.
Steam: Generation and thermodynamic properties of steam, numerical problems.
Self- Study: Geothermal energy sources.

(7 Hours)

Module – 2

Hydraulic Turbines: Principle and operation of impulse and reaction turbine.
Internal Combustion Engines: Working of 4 stroke petrol and diesel engine, numerical problems.
Introduction to Electric Vehicles: Configuration, advantages and disadvantages.
Self- Study: Collect the information about various hydraulic dams in World, India and Karnataka.

(8 Hours)

Module – 3

Refrigeration: Refrigerants, terms used in refrigeration system, principle and working of Vapour compression refrigeration. Principle and application of air conditioners.
Belt Drives: Open and Cross belt drives, derivation for length of belt, numerical problems.
Gear Drives: Types of gear drives, advantages and disadvantages over belt drives.
Self- Study: Other types of power transmission system.

(8 hours)

Module – 4

Engineering Materials: Properties, and industrial application of ferrous, nonferrous, ceramics, composites and smart materials.
Metal Joining Processes: Soldering and Brazing, working of different welding processes.

Conventional Machining: Lathe machine and its operations (turning, facing, taper turning by swivelling compound rest, knurling, thread cutting, drilling).

Self- Study: Application of advance materials in real world. Other methods of joining process and their applications.

(8 hours)

Module – 5

Advanced Manufacturing Systems: Types of automation, Computer Numerical Control (CNC) machines.

Robotics: Common robot configurations and its applications.

Hands on Training: Arc welding, oxy – acetylene welding, TIG welding and MIG welding, operations of Lathe machine – turning, facing, knurling, taper turning by swivelling compound rest.

Self- Study: Advantages of automation and robotics over conventional system.

(09 hours)

Course Outcomes:

The students will be able to:

CO1: Summarize various energy conversions and power transmission systems with working principles, materials and manufacturing techniques.

CO2: Apply the thermodynamic principles in formation and application of steam energy, construction and working of refrigeration system and air conditioners.

CO3: Analyze the performance of IC engines and power transmitting devices.

CO4: Identify suitable tools, techniques and manufacturing processes used for real world applications.

CO5: Demonstrate ability to work as an individual and a team member to investigate the recent technologies by self learning.

Assessment Methods (100%):

CIE Methods/Components (50%):

- **Three Internal Assessments** conducted for 50 Marks each and reduced to 25 Marks. Average of three Internal Assessments will be considered for 25 Marks.
- **Alternative Assessment** will be conducted for 50 Marks using appropriate tools and reduced to 25 Marks.

SEE Question Paper Pattern (50%):

- Conducted for 100 Marks and reduced to 50 Marks.
- **Part - A:** Comprises 20 objective type questions carrying 1 Marks each with a total 20 Marks.
- **Part - B:** Comprises 10 descriptive type questions carrying 16 Marks each. Each Module will have two questions with an internal choice to answer one. There will be maximum of three sub section in each question.

Textbooks:

1. K. R. Gopalakrishna, "Elements of Mechanical Engineering", Subhas Publications, 38th Edition, 2019.
2. S. Trymbaka Murthy, "Text book of Elements of Mechanical Engineering", MEDTECH, Scientific International Pvt Ltd, 1st Edition, 2019.
3. Mehrdad Ehsani, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles", CRC Press, 1st Edition, 2005.

References:

1. Groover, Milell P, "Automation, Production Systems & Computer-Integrated Manufacturing", Pearson, 4th Edition, 2018.
2. K. P Roy, "Elements of Mechanical Engineering", Media Promoters & Amp; Publishing Pvt. Ltd, 7th Edition, 2014.
3. Dr. A. S. Ravindra, "Elements of Mechanical Engineering", Best Publications, 7th Edition, 2009.

DEPARTMENT OF CHEMISTRY
(Choice Based Credit System (CBCS)
SEMESTER – I/II

Engineering Chemistry Laboratory (0:0:1) 1
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21CHL16/26	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:1:2	SEE Marks	50
Total Number of Contact Hours	42	Exam Hours	3

Course Objectives:

This course will enable students to:

1. Enabling learners with hands-on experience on the various analytical instruments for qualitative and quantitative analysis.
2. Decide appropriate standard techniques for engineering and environmental applications.

	Instrumental Experiments
1.	Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution
2.	Conductometric estimation of acid mixture using strong base.
3.	Determination of viscosity of sample oil by redwood / Oswald's Viscometer
4.	Determination of pKa of the given weak acid using pH meter.
	Volumetric Experiments
1.	Estimation of Total hardness of water by EDTA complexometric method to check its suitability for drinking purpose
2.	Determination of COD of waste water.
3.	Estimation of Iron in steel using standard $K_2Cr_2O_7$ solution by using external indicator method
4.	Determination of percentage of Copper in brass using standard sodium thiosulphate solution
	Open Ended Experiments
1.	Colorimetric estimation of Copper in $CuSO_4$ solution.
2.	Estimation of sodium and potassium by Flame photometer
3.	Estimation of percentage of available chlorine in the given sample of bleaching powder (Iodometric method)
4.	Determination of solubility product of $MgCO_3$ by complexometric titration using EDTA
5.	Analysis of mineral content and acidity of soil.
6.	Estimation of Fluoride content using SPADNS by colorimetric estimation
7.	Estimation of Fluoride using Fluorimeter
8.	Determination of chloride content of water by Argentometry
9.	Determination of Surface tension of lubricants/water.
10.	Preparation of Aspirin and Paracetamol.

Course Outcomes:

The students will be able to:

CO1: To apply principles and protocols related to chemical analysis.
CO2: Critically evaluate the quality of the results and become familiar with the safety ethics.

Examination pattern:

- SEE will be conducted for 3 hours.
- Two experiments, one from part A and one from part B has to be completed.
- Part A experiment is given on a lotto basis and part B is common for all students in a batch.

Textbooks:

1. B. Viswanathan and P. S. Raghavan. "Practical Physical Chemistry", 2009.
2. Sunita Rattan, S. K. Kataria & Sons. "Experiments in Applied Chemistry", 3rd Edition, 2011.
3. Dr. Sudha Rani. "Laboratory Manual on Engineering Chemistry", Dhanapat Rai publishing company, 2nd Edition, 2000.

References:

1. Douglas A. Skoog, F. James Holler and Stanley R. Crouch. "Principles of Instrumental Analysis", 6th Edition, 2006.
2. J. Mendham, R.C. Denney, J. D. Barnes and M.J.K. Thomas. "Vogel's Quantitative Chemical Analysis", 6th Edition, 2000.

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
Choice Based Credit System (CBCS)
SEMESTER – I / II

Indian Knowledge System – (0:1:0) 1
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21AE17/27	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:2:0	SEE Marks	50
Total Number of Contact Hours	26	Exam Hours	2

Course Objectives:
The course will enable the students to:
1. Appreciate the knowledge systems developed by various cultures and civilisations, including the Indian Knowledge System
2. See the commonality amongst the knowledge systems developed by various cultures and civilisations
3. Develop a view of filling any gaps, of being mutually enriching, rather than to criticise or reject any knowledge system

Module – 1

Preamble: India developed its knowledge system, tested it through practice, verified and improved it over thousands of years. As a result, the Indian Knowledge System is founded on the 'wellbeing of all' and is based on a deep understanding of human beings as well as of nature and entire existence. It seems to satisfy the requirement of a holistic and humane knowledge system.

Heritage and Context of Indian Knowledge System: Relevance and Basic structure of Indian Knowledge (Veda, Upaveda, Vedangas etc) History of education in India, Comparison of IKS with other systems, Ethics, Polity and Governance in IKS, Sources and Modes of Interpretation for historical Reconstruction

(05 Hours)

Module – 2

Indian Arts, Languages and Literature: Indian Aesthetics, Text and Grammarians in India, Value of Indian Knowledge System in modern world, Role of Individuals in application of the IKS, Systemic Challenges and Solutions

(05 Hours)

Module – 3

Traditional Knowledge in Medicine and Climate: Ayurvedic philosophy of managing the individuals health, health of the society, sustainable development depicted in Indian tradition, Observing harmony with the nature

(05 Hours)

Module – 4

Mathematics and Astronomy in IKS: Heliocentric Solar System, Calendar in Ancient India, Indian Astronomy and comparison with other system, Number Systems, Algebra and Geometry, Diffusion of Indian Knowledge to other cultures

(05 Hours)

Module – 5
Architecture in India: Archeology as a source to understand India, political and historical geography, Archaeological sites and artefacts, Heritage Management **IKS and Intellectual Property:** Necessity of IKS protection, IKS and the Law, Patents in IKS (06 Hours**)**
Course Outcomes: The students will be able to: 1. Discuss the traditional knowledge system and compare with modern system 2. Review the IKS and its applications in solutions to modern day problems.
Teaching Practice: • Classroom teaching • ICT – PowerPoint Presentation • Audio & Video Visualization Tools
Exam Pattern: **CIE: 50 Marks** • 30 Marks Internal Assessment Examination • 20 Marks Alternate Assessment methods: **Case Study:** Preparation of a term paper on a topic selected in consultation with the Course Faculty (Max of 3 students per team). **SEE: 50 Marks** • The SEE will be evaluated for 100 marks, and reduced to 50. This is further split into 20 marks MCQ and 80 marks descriptive answers. • Part A: 20 MCQs carrying 1 mark each covering the entire syllabus.. • Part B: Will have 5 questions. Each full question is for 16 marks. (the students will answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions. • The marks obtained for 100 marks in the SEE will be reduced to 50 marks.
Textbooks 1. Ancient Hindu Science: Its impact on the ancient and modern worlds, Alok Kumar, Jaico Publishing House, 2019. 2. Traditional Knowledge System in India, Amit Jha, Atlantic Publishers and Distributors Pvt Ltd (1 January 2009). **References** 1. Indian Knowledge Systems (2 Vols), Kapil Kapoor, Awadhesh Kumar Singh, D.K. Print World Ltd; Ist edition (15 October 2005) 2. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014. 3. Vedic Science and Technology, Sadashiv Biswal, Bidyut Lata Ray, D. K. Print World 2009.

DEPARTMENT OF MATHEMATICS Choice Based Credit System (CBCS)

SEMESTER - II

Advanced Calculus, Laplace Transforms & Linear Algebra (2:0:1)3

(Common to all Branches)

(Effective from the Academic year 2021-22)

Course Code	21MA21	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:1:1	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3 Hours

Course Objectives:

This course aims to prepare the students to:

- apply knowledge of Mathematics in various engineering fields by making them to learn the basic tools of Differential Calculus, Integral Calculus and Linear Algebra
- familiarize with the important tools of ordinary differential equations required to analyse the engineering problems and to have an insight into Laplace transforms

Module – 1

Introduction: A glimpse of the significance of Calculus, Differential Equations, Laplace Transforms and Linear Algebra in the field of Engineering, Statistics, Economics & Medicine. (1 Hour)

Differential Calculus: Curvature and Radius of curvature- Cartesian, parametric, polar and pedal forms (without proofs); Indeterminate forms - L' Hospital's rule (0^0, ∞^0, 1^∞); Maxima and Minima for a function of two variables; Method of Lagrange multipliers with one subsidiary condition.

Applications of Maxima and Minima with illustrative examples.

Self learning component: Problems on indeterminate forms such as $0/0$, ∞/∞, $0x\infty$, $\infty-\infty$

Hands On Session: Using MATLAB,

1. Transform cartesian to polar coordinates in two dimension, cylindrical and spherical polar coordinates in three dimension
2. Create 2D & 3D plots (cartesian, polar & parametric curves)
3. Determine Curvature, Radius of Curvature & Evolutes
4. Evaluate Maxima and Minima of functions of several variables (8 Hours)

Module – 2

Differential Equations : Second and higher order homogeneous and non-homogeneous linear ODE with constant coefficients - Inverse differential operators (Cases I-III), Cauchy differential equations and Method of variation of parameters.

Applications to oscillations of a spring and L-C-R circuits

Self learning component : Legendre differential equations & problems

Hands On Session: Using MATLAB,

1. Solve LDE of second and higher order with constant & variable coefficients
2. Obtain solution of initial and boundary value problems
3. Determine the Laplace Transform of elementary functions
4. Develop the Laplace Transform of periodic function, Heaviside (Unit Step) function and Dirac delta (Impulse) function
5. Evaluate the Inverse Laplace Transform of functions in s
6. Solve ODE formulated for real world problems (8 Hours)

Module –3

Multiple Integrals: Review of elementary Integral Calculus; Multiple integrals: Evaluation of double and triple integrals; Evaluation of double integrals by change of order of integration and changing into polar coordinates; Applications to find area (using double integration) and volume (using triple integration); Beta and Gamma functions: Definitions, Relation between Beta and Gamma functions and simple problems

Self learning component : Applications of double integration to find surface area & volume of solids

Hands on Session : Using MATLAB,

1. Evaluate double integrals
2. Evaluate triple integrals

(8 Hours)

Module – 4

Laplace Transforms: Definition and Laplace transforms of elementary functions, Laplace Transforms of $e^{at}f(t), t^n f(t)$, n is a positive integer & $\frac{f(t)}{t}, t \neq 0$ (without proof), Periodic function (statement only) and Unit-step function – problems.

Inverse Laplace Transform: Definition and problems, Convolution theorem to find the inverse Laplace Transforms (without Proof) and problems. Solution of linear differential equations using Laplace Transform technique.

Applications of Laplace Transforms in Control Engineering

Self learning component : Proofs of Laplace Transforms of $e^{at}f(t)$, $t^n f(t)$, n is a positive integer & $\frac{f(t)}{t}, t \neq 0$ and Laplace Transform of Impulse (Dirac delta) function,

problems

(8 Hours)

Module – 5

Linear Algebra: Rank of a matrix-echelon form. Solution of non-homogeneous system of linear equations – consistency. Gauss-elimination method, Gauss –Jordan method and Approximate solution by Gauss-Seidel method; Eigen values and eigen vectors - Rayleigh's power method; Diagonalization of a square matrix of order two; Linear transformations & Quadratic forms - Definition with examples

Applications of Linear Algebra to Electrical Circuits, Traffic Flow, Image Processing Techniques, Robotics

Self learning component : Diagonalization of a square matrix of order three

Hands on Session : Using MATLAB,

1. Create and work with matrices
2. Solve the system of linear equations
3. Find the eigenvalues and eigenvectors of a square matrix (8 Hours)

Recap/Summary of the Course (1 Hour)

Course Outcomes:

The students will be able to:

CO1: Apply the knowledge of Differential Calculus to determine the bentness of a curve and extreme values of a function of several variables.

CO2: Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.

CO3: Apply the concept of Gamma & Beta functions, change of order of integration and variables to evaluate single & multiple integrals and double and triple integrals in computing the areas and volumes respectively.

CO4: Apply Laplace transform technique to solve differential/ integral equations arising in network analysis, control systems and other fields of engineering.

CO5: Make use of matrix theory to solve system of linear equations and to compute eigen values and eigen vectors required for matrix diagonalization process & Quadratic Forms.

Question paper pattern:

SEE will be conducted for 100 marks.

- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.

CIE will be announced prior to the commencement of the course.

- 25 marks for test. Average of three tests will be taken.
- 25 marks for Alternate Assessment Method.

Textbooks :

1. E. Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons, 2015.
2. B.S. Grewal, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, 2015.
3. N.P. Bali and Manish Goyal, "Engineering Mathematics", 3rd Edition, Oxford University Press, 2016.

References :

1. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill, 2006.
2. H. K. Dass and Er. Rajnish Verma, "Higher Engineering Mathematics", 1st Edition, S. Chand Publishers, 2011.
3. S. L. Ross, "Differential Equations", 3rd Edition, Wiley India, 1984.
4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, "An Introduction to Linear Algebra", Reprint Affiliated East–West Press, 2005.

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
Choice Based Credit System (CBCS)
SEMESTER - II

Technical English – II (0:1:0) 1
(Common to all Branches)
(Effective from the academic year 2021-22)

Course Code	21HS28	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:1:1	SEE Marks	50
Total Number of Contact Hours	26	Exam Hours	2

Course Objectives:
This course will enable students to:
1. Demonstrate proficiency in communicative skills.
2. Formulate based on the demand of their profession with high command in English.

Module – 1

Preamble: Relevance of the subject to real-time Global, Economic and Societal Scenario. Need of English language to fetch better job opportunities, and Internships in the current scenario. Importance of good communication to broaden your world.

Introduction to Functional English: Cloze Test**,** Question Tags**,** Tenses (with correct use of verb forms)**,** Active and Passive Voice**,** Reported Speech

(6 Hours)

Module – 2

Introduction to Technical English: Listening Skills – Listening to Scientific and Technical talks and answer the objective questions**,** Reading Skills – Reading short Technical texts from Journals, Newspapers & Business reports

(4 Hours)

Module – 3

Technical Writing Skills: Precise Writing of Business report (after listening and reading),Formal Letter (Formals and Types),Business Letters: Quotations, Purchase Order, Terms & Condition of Contracts, Job Application Letter (with covering letter)**,** Resume, Biodata, C.V. (its differences)**,** Email and Blog Writing

(4 Hours)

Module – 4

Presentation Skills: Formal Presentations, Paper Presentation**,** Report Writing and Presentation**,** Extempore / Public Speaking**,** Dialogues in various situations

(6 Hours)

Module – 5

Soft Skills Presentation: Mock Interviews, Group Discussion (GD) (with related topics)

(6 Hours)

Course outcomes:

Students will be able to:

CO1: Develop strategies and skills to enhance ability to read and comprehend engineering and technology texts.

CO2: Assess listening skill which will help them comprehend lectures and talks in their areas of specialization.

CO3: Deduce ability to write convincing job applications and effective reports.

CO4: Construct their lingual power and word power, and frame suitable structures to use English for all purposes of technical communication.

CO5: Distinguish different strategies for public and professional talks.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three test will be taken.
- 25 marks for Alternate Assessment Method.

Alternate Assessment Method: Activity Report/Seminar Presentation/Group Discussion

Textbooks:

1. Gajendra Singh Chauhan and et. al., Technical Communication. Cengage learning India Pvt Limited, 2018.
2. Sanjay Kumar and Pushpa Lata. Communication Skills. Oxford University Press, 2018.

References:

1. M. Ashraf Rizvi, Effective Technical Communication. McGraw Hill Education (India) Private Limited**,** 2nd Edition, 2018.
2. Wren & Martin, High School English Grammar & Composition. S Chandh Publisher, 2015. Kumar, Suresh. E., Engineering English. Orient Blackswan, 2015.

VIDEOS & LECTURES: Relating to IELTS, GRE, TOFEL & other exams like UPSC/ State/ SSB/ IBPS are used in different modules.