Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Mathematics
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**CALCULUS & DIFFERENIAL EQUATIONS**						
Course Code	**21MAT101**						
Category	Basic Science Course (BS)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	03	02	00	00	05	65	04
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVE: This course is intended to impart to the students the skills of employing the basic tools of differential and linear algebra for solving basic and difficult engineering problems.

UNIT I

Differential Calculus-1: Recapitulation of differentiation, Taylor's and Maclaurin's series for single variable (no proof). Introduction to polar curves, expression for angle between radius vector and the tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature- Cartesian, parametric, polar and pedal forms.

Self-study: Indeterminate forms, center and circle of curvature.

UNIT II

Differential Calculus-2: Partial derivative of first and second order, total derivative, derivative of composite function. Euler's theorem for function of two variables. Jacobians and property $JJ' = 1$. Taylor's series for functions of two variables (no proof). Maxima and minima for function of two variables.

Self-Study: Errors and approximations, Extended Euler's theorem, Lagrange's undetermined multiplier method.

UNIT III

Ordinary differential equations (ODE's) of first order: Linear differential equations. Reducible to linear differential equation, Bernoulli's equations. Exact and reducible to exact differential equations. Orthogonal trajectories in Cartesian and polar form. Introduction to general and singular solutions; solvable for *p* only and Clairaut's equations.

Self-study: Reducible to Clairaut's equations. Application to Newton's law of cooling.

UNIT IV

Ordinary differential equations (ODE's) of higher order: Higher order linear ODE's with constant coefficients, Inverse differential operator method (no product of functions). Method of variation of parameter. Cauchy's and Legendre's homogenous linear differential equations. Applications: L-C-R circuits.

Self-study: Method of Undetermined co-efficients.

UNIT V

Linear Algebra: Elementary row and column operations of a matrix**,** echelon form, Rank of matrix. Consistency of homogeneous and non-homogeneous equations. Gauss elimination, Gauss Jordan and Gauss-Seidel methods.

Self-study: Solution of system of linear equations by Jacobi method, eigenvalues and eigenvectors.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: Determine the rate of changes, extreme values, Taylor's series for the function of two variables and rank of a matrix.
CO2: Solve ordinary differential equation and system of linear equations.
CO3: Test for angle of polar curves, consistency of linear equations, the independency of two functions of two identical independent variables and orthogonally of two polar curves.
CO4: Describe Mathematical procedures to find integrating factors, orthogonal trajectories, complementary functions, particular integrals and consistency of system of equations.
CO5: Identify the mathematical techniques of solving ordinary differential equations.
CO6: Apply the terminologies of calculus and linear algebra for approximations.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics (44^{th} Edition 2018), Khanna Publishers, New Delhi.
2. E. Kreysizig, Advanced Engineering Mathematics, John Wiley and sons, 10^{th} Ed. (Reprint) 2016.

REFERENCE BOOKS

1. V. Ramana : Higher Engineering Mathematics, Mc Graw –Hill Education,11^{th} Ed..
2. H. C. Taneja, Advanced Engineering Mathematics, Volume I & II, I.K. International Publishing House Pvt. Ltd., New Delhi.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

ONLINE RESOURCES

1. http://www.nptel.ac.in
2. https://en.wikipedia.org

SCHEME FOR EXAMINATIONS

MAPPING of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1												
CO2												
CO3												
CO4												
CO5												
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Mathematics
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**ADVANCED CALCULUS AND NUMERICAL METHODS**						
Course Code	**21MAT201**						
Category	Basic Science Course (BS)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	03	02	00	00	05	65	04
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVE: This course is intended to impart to the students the skills of employing the basic tools of Calculus and Numerical methods for solving basic and difficult engineering problems.

UNIT I

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

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

Self- Study: Centre of gravity, Moment of inertia.

UNIT II

Vector Differentiation: Scalar and vector point functions, gradient, directional derivative, divergence, curl and Laplacian of a vector field. Solenoidal and irrotational vector fields. Vector identities (without proof).

Vector Integration: Line integrals, Applications to work done by a force. Green's theorem in a plane and Gauss Divergence theorem (without proof) involving cubes and rectangular parallelepiped.

Self- Study: Surface integrals and Stoke's theorem.

UNIT III

Partial Differential Equations (PDE's): Formation of PDE's by elimination of arbitrary constants and functions. Solution of non-homogeneous PDE by direct integration. Homogeneous PDE's involving derivative with respect to the one independent variable only. Solution of one- dimensional heat equation and wave equation by the method of separation of variables.

Self- Study: Solution of Lagrange's linear PDE. Derivation of one-dimensional heat equation and wave equation.

UNIT IV

Numerical Methods-1: Solution of polynomials and transcendental equations: Regula–Falsi and Newton–Raphson method (without proof). Interpolation-Newton's forward and backward difference formulae, Newton's divided difference formula, Lagrange's interpolation formula and its inverse interpolation formula(without proof).

Numerical differentiation and Integration: Approximation of derivatives using Newton's forward and backward interpolation polynomials. Numerical integration using Simpson's $(1/3)^{rd}$ and Simpson's $(3/8)^{th}$ rules (without proof).

Self- Study: Newton–Raphson method for repeated roots, Weddle's rule.

UNIT V

Numerical Methods-2: Numerical solutions of Ordinary Differential Equations of first order and first degree: Taylor's series method, Modified Euler's method, Fourth order Runge kutta method (without proof). Multi steps methods-Milne's predictor- corrector formula (No derivation).

Self- Study: Euler's method, Picard's method, Adam- Bashforth method.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: At the end of the course the students are able to:

CO1: Show the equivalences of mathematical expressions involving differentiation and integration.
CO2: Find divergence, directional derivatives and root of equations.
CO3: Estimate the function value, area bounded, flux and work done.
CO4: Illustrate mathematical procedures to change the order of integration, method of separation, predictor and corrector.
CO5: Identify the mathematical tool for solving flow models, improper integrals, interpolation and quadrature.
CO6: Apply the integral operator and vector differential operator for mensuration and measurements in complex engineering field.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics (44^{th} Edition 2018), Khanna Publishers, New Delhi.
2. E. Kreysizig, Advanced Engineering Mathematics, John Wiley and sons, 10^{th} Ed. (Reprint) 2016.

REFERENCE BOOKS

1. V. Ramana : Higher Engineering Mathematics, Mc Graw –Hill Education,11^{th} Ed..
2. H. C. Taneja, Advanced Engineering Mathematics, Volume I & II, I.K. International Publishing House Pvt. Ltd., New Delhi.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

ONLINE RESOURCES

1. http://www.nptel.ac.in
2. https://en.wikipedia.org

SCHEME FOR EXAMINATIONS

MAPPING of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Physics
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**ENGINEERING PHYSICS**						
Course Code	**21PHT102/202**						
Category	Basic Science Course (BS)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	03	00	00	00	03	40	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVE: To introduce the Engineering students to the basics of elasticity, vibrations, quantum mechanics, electrical and dielectric properties of materials, laser and fiber optics, crystal structure and nanomaterials with an emphasis on inculcating strong analytical skills among them so that they can understand and analyze complex engineering problems with relative ease.

UNIT I **8 hours**

Elasticity: Torsion: Expression for couple per unit twist of a solid cylinder (derivation). Torsional Pendulum: Expression for period of oscillation and Rigidity modulus (derivation). Bending of Beams: Definition of beam, neutral surface and neutral axis. Expression for bending moment of a beam (derivation). Expression for Young's modulus of the material of a single cantilever (derivation). Numerical problems.

Vibrations: Theory of free vibrations, theory of damped vibrations and discussion of three cases of damping. Theory of Forced vibrations. Resonance: Condition for resonance, sharpness of resonance. Numerical problems.

Self-study component: Types of beams and its engineering applications, application of damping in automobiles, LCR resonance.

UNIT II **8 hours**

Modern Physics: de- Broglie hypothesis: de Broglie wavelength for free and accelerated electron. Concept of wave packet. Phase velocity, group velocity (no derivation), relation between phase velocity and group velocity, relation between group velocity and particle velocity, relation between phase velocity, group velocity and velocity of light. Numerical problems.

Quantum Mechanics: Heisenberg's uncertainty principle and its physical significance. Application of uncertainty principle: Non-confinement of electron in the nucleus. Wave function. Properties and Physical significance of a wave function. Probability density and Normalization of wave function. Setting up of one dimensional time independent Schrödinger's wave equation. Eigen values and Eigen functions. Application of Schrödinger wave equation to a particle in a box: Expression for energy Eigen values and Eigen functions for a particle in one-dimensional potential well of infinite height and finite width, discussion of wave functions and probability density for a particle in a box for ground and first excited state. Numerical problems.

Self-study component: Davisson and Germer experiment, Matter waves and their properties. Discussion of wave functions and probability density for a particle in a box for n=3, Quantum tunneling.

UNIT III **8 hours**

Electrical properties: Assumptions of quantum free electron theory, Fermi level, Fermi energy, Fermi velocity and Fermi temperature. Fermi factor f(E) and its dependence on temperature. Expression for density of states (qualitative), expression for Fermi energy at absolute temperature (derivation). Electrical conductivity using effective mass and Fermi velocity (derivation). Merits of quantum free electron theory. Numerical problems.

Dielectric properties: Introduction to dielectrics: types of dielectrics, polarization, polarizability, dielectric constant, relation between dielectric constant and polarizability. Polarization mechanism and types of

polarization. Derivation of equation for internal field in liquids and solids (1-Dimensional). Expression for Classius -Mossotti equation (Derivation). Numerical problems.

Self-study component: Distinguish between CFET and CFET, applications of dielectric materials in engineering (Mica, glass, rubber, and porcelain), Piezo-electricity.

UNIT IV **8 hours**

Lasers: Interaction of radiation with matter: Induced absorption, spontaneous emission and stimulated emission of radiation. Expression for energy density in terms of Einstein's coefficients (derivation). Requisites of a laser system. Condition for laser action. Principle, construction and working of He-Ne laser. Application of laser: Holography, principle, recording (wave front division technique) and reconstruction of 3-D images. Mention of applications of holography. Numerical problems.

Optical fibers: Propagation mechanism in optical fibers. Expression for angle of acceptance and numerical aperture (derivation). Fractional index change, V- number and modes of propagation (N). Types of optical fibers. Attenuation: expression for attenuation coefficient (derivation). Application of optical fibers: Point to point communication with block diagram. Advantages and limitations of fiber optic communication over conventional communication system. Numerical problems.

Self-study component: Applications of laser in medical and industry. Discuss the causes for attenuation in optical fibers.

UNIT V **8 hours**

Crystal Structure: Seven crystal systems, Miller indices, Interplanar spacing in terms of miller indices. X-ray diffraction, Bragg's law (derivation), Bragg's X-ray spectrometer (construction and working) and determination of crystal structure by Bragg's X-ray spectrometer, Numerical Problems.

Nanomaterials: Nano Scale, Surface to Volume Ratio, Quantum Confinement, types of nanomaterials, Synthesis of nanomaterials: Top-down approach: High energy Ball-milling method and Bottom-Up approach: Sol-Gel method. Characterization Technique: Scanning Electron Microscope (SEM), Properties of nanomaterials: Mechanical, electrical, magnetic and optical.

Self-study component: Co-ordination number, Atomic packing factor (APF) for simple cubic, body centered and face centered cubic structure. Applications of nanomaterials: Medical and Electronics.

TEACHING and LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: Apply the knowledge of elasticity and vibrations to engineering.

CO2: Apply the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equation and its application to a matter wave system.

CO3: Summarize the importance of free electrons in determining the properties of metals; understand the concept of Fermi energy. Gain the knowledge of the electrical and dielectric properties of a materials.

CO4: Describe the basics of laser Physics, working of lasers, holography and principle of propagation of light in optical fibers.

CO5: Recognize various planes in a crystal and describe the structure determination using X-rays.

TEXT BOOKS

1. P. S. Aithal, H. J. Ravindra, Textbook of Engineering Physics, Acme Learning Pvt. Limited, New Delhi, 1st edition, (2017).
2. Dr. Amit Sarin, Anil Rewal, Engineering Physics Books, Wiley India Private Ltd., New Delhi 9th Edition (2014).
3. Avadhanulu M. N. and P.G. Kshirsagar, A text Book of Engineering Physics, 10th Edition (2014).
4. Engineering Physics by Gaur and Gupta, Dhanpat Rai Publications (P) Ltd.

5. Dr. K. Vijayakumar, Dr. S. Chandralingum, Modern Engineering Physics, S. Chand and Company Limited, 1st edition 2010
6. K. K. Chattopadhyay, Introduction to Nanoscience and Nanotechnology, PHI India, (2009).
7. Sulabha Kulkarni, Introduction to Nanoscience and Nanotechnology 2nd Edition (2012)

REFERENCE BOOKS

1. S. O. Pillai, Solid State Physics, New Age International. Sixth Edition.
2. A Marikani, Engineering Physics, PHI Learning Private Limited, Delhi - 2013
3. Prof. S. P. Basavaraju, Engineering Physics, Subhas Stores, Bangalore.
4. V. Rajendran , Engineering Physics, Tata McGraw Hill Company Ltd., New Delhi -2012
5. S. Mani Naidu, Engineering Physics, Pearson India Limited – 2014
6. Ajoy Ghatak, Optics, Tata McGraw Hill, 2005.
7. Arthur Beiser, Concepts of Modern Physics, McGraw Hill, 7th edition 2017.

ONLINE RESOURCES

1. http://www.nptel.ac.in
2. https://en.wikipedia.org
3. https://physicsworld.com/

SCHEME FOR EXAMINATIONS

There shall be 10 questions

1) Two full questions to be set from each unit with internal choice
   - Minimum number of sub questions : 2
   - Maximum number of sub questions : 2
2) Each full question shall be for a maximum of 20 marks
3) Answer any Five full questions choosing at least One full question from each unit

Note: Questions from Self-study component will not be asked for CIE and SEE.

MAPPING of COs with POs

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

Strength of correlation: Low-1, Medium- 2, High-3

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Electrical and Electronics Engineering
Scheme and Syllabus - CBCS –2021 -2022

Course Title	**BASIC ELECTRICAL ENGINEERING**						
Course Code	**21EET103/21EET203**						
Category	Engineering Science (ES)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	02	02	00	00	04	52	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVE:

1. Understand the basic laws of electrical engineering and energy billing.
2. Explain the working of basic electrical parameters under sinusoidal excitation.
3. Analyze the series and parallel electrical circuits for voltage, current, power, and energy.
4. Describe the construction and working principles of electrical machines.
5. Explain electric power generation, transmission and distribution, wiring schemes and equipment and personal safety measures.

UNIT I **6+6 hours**

DC circuits: Ohm's law and Kirchhoff's laws, analysis of series, parallel, and series-parallel circuitsexcited by independent voltage sources. Power and energy, maximum power transfer theorem appliedto the series circuit and its applications.

Electromagnetism and AC Fundamentals: Faraday's laws, Lenz's law. Fleming's rules & dynamically induced e.m.f. Statically induced e.m.f.s., the concept of self and mutual inductance & coefficient of coupling, force on the current-carrying conductor. Generation of sinusoidal voltage, average and RMS value, form factor, and peak factor.

Self-Study: Basics of lead acid batteries, nickel - iron batteries, lithium – ion batteries, advantages and disadvantages of batteries, rating of batteries in ampere - hour.

UNIT II **5+5 hours**

Single-phase circuits: Voltage, current, and power waveforms with phasor diagram, in R, L, and C circuits. Analysis of R-L, R-C, R-L-C Series and Parallel circuits, Real, reactive and apparent powers, power triangle, and Power factor.

Three-phase circuits: advantages of three-phase systems, generation of three-phase power, representation of the balanced star (3 wire and 4 wire system) and delta connected loads, phase and line relations of voltages and currents from phasor diagrams. Measurement of three-phase power by the two-wattmeter method.

Self-Study: Electric Wiring : Casing and cap wiring, Open conduit and closed conduit systems. Advantages and disadvantages. Types of wires used for lighting and heating (power) circuits.

UNIT III **5+5 hours**

DC Machines: (**a)** Principle of operation, constructional details, induced emf equation, types of generators, and the relation between induced emf and terminal voltage.

(b) Principle of operation, back emf and torque equations, types of motors, characteristics (shunt and series only), and applications.

Transformers: Necessity of transformer, the principle of operation, Types, and construction of single-phase transformers, emf equation, losses, efficiency, and condition for maximum efficiency.

Self-Study: DC compound generators, compound motors, three phase transformers – types and constructions.

UNIT IV **5+5 hours**

Three-phase induction Motors: Concept of rotating magnetic field, the principle of operation, constructional features of motor, types – squirrel cage and wound rotor and their applications., slip, the significance of slip, and problems on slip calculations.

Three-phase synchronous generators: Principle of operation, constructional features of salient and non-salient pole generators, synchronous speed, frequency of generated voltage, emf equation, with the concept of winding factor (excluding the derivation and calculation of winding factors)

Self-Study: Single phase induction motors: Double field revolving theory. Types, Working principle and constructions.

UNIT V **5+5 hours**

Power transmission and distribution- Concept of electric power transmission and distribution. Low voltage distribution system (400 V and 230 V) for domestic, commercial, and small scale industry through block diagram/single line diagrams only

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

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

Personal safety measures: Electric Shock, Safety Precautions, Earthing, and its types.

Self-Study: Electrical Power Generation: Sources of energy – renewable and non-renewable, working principle of hydel, thermal, nuclear, wind and solar power plants through block diagrams, environmental effects and advantages and disadvantages.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: Describe the basic concepts in electrical engineering.
CO2: Analyze-dc circuits, single-phase, and three-phase ac circuits.
CO3: Explain the construction and operation principle of electrical machines.
CO4: Solve basic problems on electrical machines.
CO5: Explain the concept of electric power transmission, distribution, electricity billing, equipment, and personal safety measures.

TEXT BOOKS

1. Basic Electrical Engineering, D. C. Kulshreshtha, McGraw-Hill Education, Revised first edition, 2019
2. Electrical and Electronic Technology, Edward Hughes, Pearson, 12th edition, 2016
3. Lecture Notes (for module 5), Dr. AIT.

REFERENCE BOOKS

1. Basic Electrical Engineering, D.P. Kothari I.J.Nagrath, McGraw-Hill Education, 4th Edition,2019.
2. Fundamentals of Electrical Engineering and Electronics, B.L. Theraja, S Chand and Company, Reprint Edition 2013.
3. Principles Electrical Engineering and Electronics, V.K Mehata, Rohit Mehta, S Chand and Company, 2nd edition, 2015.

ONLINE RESOURCES

1. http://www.nptel.ac.in
2.https://www.youtube.com/watch?v=IZA_bJiGiJc&list=PL_mruqjnuVd8LP2z0c4yBwKAGEiEW_Si9&index=1
3. https://www.youtube.com/watch?v=3TR_DS_7z2w&list=PLbRMhDVUMngfdEXVcdf_ijj2Eub-UHs_y

SCHEME FOR EXAMINATIONS

(i) The question paper will have ten full questions carrying equal marks.
(ii) Each full question will be for 20 marks.

(iii) There will be two full questions from each module.
(iv) Each full question will have sub-questions (subject to a maximum of four sub-questions)
(v) SEE and CIE will not carry any questions from Self study component.
(vi) The students have to answer five full questions, selecting one full question from each module.

MAPPING of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO	PO	PO9	PO10	PO1	PO1	PSO1	PSO2	PSO3
CO	3	3						1		1		1	3	1	1
CO	3	3						1		1		1	3	1	1
CO	3	3						1		1		1	3	1	1
CO	3	3						1		1		1	2	1	1
CO	3	3				3	1	1		1		1	3	1	1

Strength of correlation: Low-1, Medium- 2, High-3

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Civil Engineering
Scheme and Syllabus – OBE - CBCS – 2021 -2022

Course Title	**CIVIL ENGINEERING AND MECHANICS**						
Course Code	**21CVT104 / 204**						
Category	**Engineering Science Course (ES)**						
Scheme and Credits	No. of Hours/Week					Total Teaching Hours	Credits
	L	T	P	SS	Total		
	3	**0**	**0**	**0**	**3**	**39**	**3**
CIE Marks: 50	**SEE Marks: 50**		**Total Max. Marks: 100**		**Duration of SEE: 03 Hours**		

Course Objectives: Students will be exposed to apply the knowledge of the principles of mechanics in various fields of engineering curricula and develop analytical ability and powers of reasoning. To become conversant with basic concepts of equilibrium with reference to support reactions and friction. To understand the significance of centroid and moment of inertia and to determine the coordinates of the centroid and moment of inertia of the composite sections. To familiarize with laws of motion, kinematics of motion and their inter relationships.

UNIT I: **7 Hours**

Basics of Civil Engineering: Introduction to Civil engineering: Scope of different fields of civil engineering – Surveying, Building materials, Construction technology, Geotechnical engineering, Structural engineering, Hydraulics, Water resource engineering and Irrigation engineering, Transportation engineering, Environmental engineering.

Infrastructure: Types of infrastructure, role of civil engineer in the infrastructure development, Effect of the infrastructure facilities on socio-economic development of a country.

Roads: Types of roads, components and their function.

Bridges and Dams: Different types with simple sketches.

UNIT II: **10 Hours**

Fundamental principles of mechanics: Introduction, basic principles and concepts of mechanics, laws of mechanics, idealization of mechanics

Basic principles of statics: Force and its characteristics, equivalent system of forces, principles of transmissibility of a force, systems of forces, resultant of coplanar concurrent forces, component of a force, moment of a force with respect to a point, principles of moments (Varignon's theorem), Couples, effects of a force at another point, equations of static equilibrium, free body diagram.

Co-planar forces (forces in a plane): Resultant of co-planar concurrent forces, equilibrium of co-planar concurrent forces and Numerical problems.

Co-planar non concurrent force system: Resultant of co-planar non-concurrent forces, equilibrium of coplanar non concurrent forces and Numerical problems.

UNIT III: **7 Hours**

Support Reactions: Introduction, Beam, Classification of beams, types of loads and supports, support reactions in statically determinate beams - Numerical problems.

Friction: Introduction, laws of dry friction, limiting friction, co-efficient of friction, angle of friction, angle of repose and cone of friction. Numerical problems on Blocks (horizontal and inclined plane), Ladder friction and Wedge friction.

UNIT IV: **8 Hours**

Centroid: Introduction, centroid and centre of gravity. Derivations of simple geometrical sections – rectangle, triangle, semicircle and quarter circle. Numerical problems on composite sections.

Moment of Inertia: Introduction, Moments of Inertia of an area, Parallel axis theorem, Perpendicular axis theorem,

Radius of gyration, Polar moments of inertia. Derivations of simple geometrical sections – Rectangle, Triangle, Circle, Semicircle and Quarter circle. Numerical problems on composite sections.
UNIT V: 7 Hours **Basic Principles of Dynamics:** Introduction, kinematics and kinetics, Definitions of Displacement, Speed, Velocity and Acceleration. D' Alembert's principle with Numerical problems. Newton's Laws of motion. Rectilinear motion with simple-numerical problems Differential relationship between displacement, velocity and accelerations.Projectile with numerical problems.

COURSE OUTCOMES: The students will be able to

CO1: Discuss the basics of Civil Engineering, Concept of Engineering Mechanics, Forces and Force Systems to determine the resultant

CO2: Define the effect of forces on the bodies in respect of its contact surfaces and the reactions developed in the system

CO3: Identify the geometrical properties like, coordinates of the centroid and Moment of Inertia of regular, irregular and built-up sections

CO4: Illustrate the kinetics, kinematics and rectilinear motion of a body with numerical approach.

TEXT BOOKS:

1. Irving H Shames, Engineering Mechanics, Prentice Hall.
2. F P Beer and E R Johnson, Vector Mechanics for Engineers, Vol-II-Dynamics, Tata McGraw Hill.
3. Engineering Mechanics by Timoshenko-Young and J V Rao, Mc Graw-Hills Book Company, New, Delhi
4. Elements of Civil Engineering (IV Edition) by S S Bhavikatti, Vikas Publishing House Pvt. Ltd. New Delhi.
5. Elements of Civil Engineering and Engineering Mechanics, by M N Shesha Prakash and G V Mogaveer, PHI Learning 2009.

REFERENCE BOOK(S):

1. R C Hibler, Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.

2. Endy Ruina and Rudraprathap, Introduction to Statics and Dynamics, Oxford University Press.

3. Shanes and Rao, Engineering Mechanics, Pearson Education

4. Bansal R J, Text Book of Engineering Mechanics, Likshmi Publications

5. Engineering Mechanics by M V S Rao and D R Durgaiah, University Press 2005

ONLINE RESOURCES

1. http://www.nptel.ac.in
2. https://en.wikipedia.org

SCHEME FOR EXAMINATION

MAPPING OF Cos WITH POs

CO & PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓		✓								✓
CO2	✓	✓										✓
CO3	✓	✓										✓
CO4	✓	✓		✓								✓

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Mechanical Engineering
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**ENGINEERING GRAPHICS**						
Course Code	**21MEL105/205**						
Category	Mechanical						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	02	00	02	00	03	40	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. Marks=100**		**Duration of SEE: 03 Hours**		

Course Objectives:

1. To understand the basic principles and conventions of engineering drawing
2. To use drawing as a communication mode
3. To generate pictorial views using CAD software
4. To understand the development of surfaces
5. To visualise engineering components

Teaching-Learning (General Instructions):

- Students should be made to aware of powerful communication tool – Drawing.
- Simple Case studies can be suitably selected by the teacher for hands on practice to induce the feel of fruitfulness of learning.
- Appropriate Models, Power Point Presentation, Charts, Videos, shall be used to enhance visualization before hands on practice.
- For application problems use very generally available actual objects. (Example: For rectangular prism / object; matchbox, carton boxes, book, etc can be used. Similarly for other shapes).
- Use any CAD software for generating orthographic and pictorial views.
- Make use of sketch book with graph sheets for manual / preparatory sketching.

UNIT I **10 hours**

Introduction: ***(Not for SEE)***

Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales.

Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes:

Introduction to Orthographic projections, Orthographic projections of points in all the quadrants. Orthographic projections of line. (Inclined to HP/VP and placed in first quadrant only)

Orthographic projections of planes; resting on HP and on VP, inclined to HP and to VP viz. triangle, square, rectangle, pentagon, hexagon and circular laminae. (Placed in first quadrant only)

Application on projections of Lines & Planes (Not for SEE)

UNIT II **10 hours**

Orthographic Projection of Solids:

Orthographic projection of right regular solids (solids resting on HP only);

Prisms and Pyramids (triangle, square, rectangle, pentagon, hexagon), Cylinders, Cones, Cubes, Tetrahedron. Applications problems on projections of Solids ***(Not for SEE)***

Projections of Frustum of cone, pyramid & truncated sphere (Not for SEE)

UNIT III **10 hours**

Isometric Projections:

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

Conversion of simple isometric drawings into orthographic views.

Problems on applications of Isometric projections of simple objects / engineering components ***(Not for SEE)***

Introduction to drawing views using 3D environment (Not for SEE)

UNIT IV **10 hours**

Development Of Lateral Surfaces Of Solids:

Development of lateral surfaces of right regular prisms, cylinders, pyramids, and cones resting with base on HP only.

Development of their frustums and truncations.

Problems on applications of development of lateral surfaces like funnels, trays ***(Not for SEE)***

Problems on applications of development of lateral surfaces of transition pieces connecting circular duct and* rectangular duct *(Not for SEE)

UNIT V **10 hours**

Multidisciplinary Applications & Practice *(Not for SEE):*

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

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

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

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

Electronics Engineering Drawings- Like, Simple Electronics Circuit Drawings.

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

COURSE OUTCOMES: On completion of the course, student should be able to:

CO1. Understand and visualize the objects with definite shape and dimensions
CO2. Analyse the shape and size of objects through different views
CO3. Develop the lateral surfaces of the object
CO4. Create a 3D view using CAD software
CO5. Identify the interdisciplinary engineering components or systems through its graphical representation

TEXT BOOKS:

1. Bhatt, N.D., Engineering Drawing: Plane and Solid Geometry, 53rd edition, Charotar Publishing House Pvt. Limited, 2019.
2. K.R Gopalakrishna & & Sudhir Gopalakrishna Textbook of Computer Aided Engineering Drawing, 39th Edition, Subash Stores, Bangalore, 2017.

3. S. N. Lal: Engineering Drawing with an Introduction to Auto CAD: First-angle Projection 1st Edition, Cengage, Publication, 2018.
4. S.N. Lal, & T Madhusudhan:, Engineering Visulisation, 1st Edition, Cengage, Publication.
5. Luzadder Warren J., Duff John M., Fundamentals of Engineering Drawing: with an Introduction to Interactive Computer Graphics for Design and Production, Prentice-Hall of India Pvt. Ltd., New Delhi, Eastern Economy Edition, 2005.

REFERENCE BOOKS:

1. Parthasarathy N. S., Vela Murali, Engineering Drawing, Oxford University Press, 2015.
2. Dhawan R. K., A Textbook of Engineering Drawing, 3/e, S. Chand Publishing, 2019.
3. Venugopal K., Engineering Drawing and Graphics, New Age International publishers, 2014.
4. Bhattacharya S. K., Electrical Engineering Drawing, New Age International publishers, second edition 1998, reprint 2005.
5. Chris Schroder, Printed Circuit Board Design using AutoCAD, Newnes, 1997.
6. K S Sai Ram Design of steel structures, Third Edition by Pearson.
7. Nainan p kurian Design of foundation systems, Narosa publications.
8. A S Pabla, Electrical power distribution, 6th edition, Tata Mcgraw hill.

SCHEME FOR CIE		
	DETAILS	**MAX. MARKS**
Manual Sketching (25)	Classwork	**15**
	Assignment	**10**
Computer Printout (15)	Classwork	**15**
Test (All Five Units)		**10**
TOTAL CIE MARKS		**50**

QUESTION PAPER PATTERN (SEE)				
Q. No.	Q1	Q2	Q3	Q4
UNIT	1	2	3	4
Marks	20	30	25	25
1. Question paper shall be set jointly by both Internal and External Examiners and made available for each batch as per schedule. ***Questions are to be set preferably from Text Books***. 2. Four Questions are to be set, one each from unit 1,2,3,4 as per the below tabled weightage details.				

SCHEME OF EVALUATION FOR SEE			
Unit	**Maximum Marks**	**Manual Sketching**	**Computer display and print out**
1	20	05	15
2	30	05	25
3	25	05	20
4	25	05	20
Total	**100**	**20**	**80**
1. Evaluation shall be carried jointly by both the examiners. **2.** After evaluation, marks obtained is reduced to 50.			

MAPPING OF COs WITH POs												
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO**
CO1	3	2	2	1	2	0	1	1	2	2	0	2
CO2	3	2	2	1	2	0	1	1	2	2	0	2
CO3	3	2	2	1	2	0	1	1	2	2	0	2
CO4	3	2	2	1	2	0	1	1	2	2	0	2
CO5	3	2	2	1	2	0	1	1	2	2	0	2
Strength of correlation: Strongly related-3, Moderately related-2, Weakly related-1, Not related-0												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Physics
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**ENGINEERING PHYSICS LABORATORY**						
Course Code	**21PHL106/206**						
Category	Basic Science Course (BS)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	00	00	02	00	02	26	01
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

Course objective: To make Engineering students to understand basic concepts and principles of Physics. Gain the practical knowledge of elasticity, vibrations, Laser and optical fibers.

Sl. No.	Title of the Experiment	Compatibility with the theory course
1.	Determination of Young's Modulus of a material by single cantilever.	Unit I
2.	Determination of Rigidity modulus of a material by torsional pendulum.	Unit I
3.	Determination of acceleration due to gravity by using bar pendulum.	Unit I
4.	Determination of resonant frequency & quality factor in Series & Parallel LCR Circuits	Unit I
5.	Determination of Planck's constant using LED's	Unit II
6.	Determination of knee voltage and resistance from I-V characteristics of Zener Diode.	Unit III
7.	Measurement of dielectric constant.	Unit III
8.	Determination of Fermi energy of copper.	Unit III
9.	Determination of wavelength of Semiconductor Laser by diffraction method.	Unit IV
10.	Determination of Acceptance angle and numerical aperture of an optical fiber.	Unit IV
11.	Radius of curvature of Plano convex lens using Newton's rings	Unit IV
12.	Energy gap of a given semiconductor	Unit III

COURSE OUTCOMES: At the end of the course the students will be able to:

CO1: Apply the Physics concepts relevantly and appropriately where ever required.
CO2: The mechanical properties of solids will be understood by carrying out experiments of Young's Modulus, rigidity modulus and bar pendulum.
CO3: The optics experiments such as wavelength of laser by diffraction and numerical aperture of an Optical fiber will help the students to understand the significance of Physics in various fields of Science and Technology.
CO4: Understand the importance of Physics in electronics.

REFERENCE BOOKS:

1. Laboratory Manual in Applied Physics -- H. Sathyaseelan. – New Age International.
2. An Advanced Course in Practical Physics -- D. Chattopadhyay and P.C. Rakshit, New Central Book Agency (p) Ltd, Kolkata .

Web link for Physics virtual lab: https://www.vlab.co.in/broad-area-physical-sciences

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Electrical and Electronics Engineering
Scheme and Syllabus - CBCS – 2021 -2022

COURSE OBJECTIVE:

Course Title	**BASIC ELECTRICAL ENGINEERING LAB**						
Course Code	**21EEL107/207**						
Category	Engineering Science (ES)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	00	00	02	00	02	26	01
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

1. To understand and measure electrical quantities and parameters.
2. To verify the relation between line and phase quantities, measure power and power factor in three-phase circuits.
3. To demonstrate fundamental laws of electrical engineering.
4. To determine the efficiency of single-phase transformers
5. To understand the significance of power, power factor, and control electrical Lamps from different places.

Expt No	Syllabus Contents	No.of Hours	Blooms Taxonomy level.
1	Measurement of Resistance using Voltmeter-Ammeter method and verification using Wheatstone bridge.	2	L1
2	Measurement of Inductance in single-phase circuit by the three-voltmeter method.	2	L2
3	Measurement of voltage, current, power, and power factor and verify line and phase relationship in the three-phase star-connected circuit.	2	L3
4	Verification of Kirchhoff's Laws in DC circuits	2	L2
5	Verification of maximum power theorem in DC circuits.	2	L2
6	Comparison of domestic lamps against their power consumption.	2	L3
7	Improvement of power factor in inductive circuits.	2	L3
8	Control of electrical Lamp from one, two and three points.	2	L2
9	Load test on a single-phase transformer.	2	L3
10	Demonstration of FUSE and MCB by creating overload and fault.	2	L1
	EXPERIMENTS BEYOND SYLLABUS		
1	Speed load characteristics of a three-phase induction motor.	2	L2
2	Voltage regulators to control electrical output.	2	L3

Course Outcomes:

CO1: Verify basic laws and theorem of electrical circuits.

CO2: Understand the power consumption of different types of lamps and control of lamps from different points.

CO3: Determine the impedance of an electrical circuit and power consumption by a 3-phase load.

CO4: Evaluate the performance of single-phase transformers.

CO5: Demonstrate the effects of fault and protection of electrical circuits.

References.

1. Dr. Eranna Dr. S. Vasudevamurthy, "Department manual.

Web Links.

1. http://vlab.amrita.edu/?sub=1&brch=75&sim=217&cnt=1/
2. http://vlab.amrita.edu/?sub=1&brch=75&sim=322&cnt=1

MAPPING of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO	3	3				1		1	1	1		1	3		1
CO	3	3				1		1	1	1		1	3		1
CO	3	3				1		1	1	1		1	3		1
CO	3	3				1		1	1	1		1	3		1
CO	3	3				1		1	1	1		1	3		1
Strength of correlation: Low-1, Medium- 2, High-3															

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Humanities & Social Sciences
Scheme and Syllabus – OBE - CBCS – 2021 -2022

Course Title	**COMMUNICATIVE ENGLISH**						
Course Code	**21HST108**						
Category	**Humanities & Social Sciences (HS)**						
Scheme and Credits	No. of Hours/Week					Total Hrs./semester	Credits
	L	T	P	SS	Total		
	1	0	1	-	02	26	01
CIE Marks: 50	SEE Marks: 50		Total Max. Marks: 100		Duration of SEE: 02 Hours		

COURSE OBJECTIVE: To enable the students to assimilate the correct patterns of the language, & to develop students insight into the structure of English language. To enrich vocabulary bank, to communicate more effectively in English, to express opinions including facts & ideas & maintain conversation in everyday situations. To use digital literacy tools their LSRW skills can be enhanced and to master good speaking skills with different strategies.

UNIT I **4 hours**

Introduction to Communicative English, Fundamentals of Communicative English, Barriers to Effective Communicative English, Different styles in Communicative English, Interpersonal Communication Skills, How to improve Interpersonal Communication Skills, Developing Interpersonal Skills. Grammar: Basic English Grammar and Parts of Speech - Nouns, Pronouns, Adjectives, Verbs, Adverbs, Preposition, Articles, Conjunctions.

UNIT II **6 hours**

Grammar: Preposition, kinds of Preposition and Prepositions often confused / used in different situations. Word Accent – Rules for Word Accent, Stress Shift, Question Tags, Question Tags for Assertive Sentences (Statements) – Some Exceptions in Question Tags and Exercises, Vocabulary: One Word Substitutes and Exercises, Synonyms and Antonyms, Exercises on it. Idioms & Phrases, Words often confused, Homophones, homonyms

UNIT III **6 hours**

Grammar: Articles – Definite & Indefinite articles, Spelling Rules and Words often Misspelt, Word Pairs (Minimal Pairs), Sequence of Tenses (Rules in use of Tenses), Situational dialogues: Self-introduction, greeting, thanking, accepting thanks, apologizing, invitations, making complaints, Wh-questions/ yes-no questions, Vocabulary: Contractions/Abbreviations, strong and Weak forms of verbs, Words Formation-Prefixes and Suffixes.

UNIT IV **5 hours**

Communication Skills: LSRW Skills

UNIT V **5 hours**

Speaking Skills**:** Extempore / Public Speaking, Difference between Extempore / Public Speaking, and Guidelines for Practice. Listening Comprehension. Oral Presentation, Role Plays Just a minute (JAM), Group Discussion, Persuasion Speech, Description.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, videos

COURSE OUTCOMES: On completion of the course, student will be able to:

CO1: Learn basic grammar rules, developed the mastery of language.
CO2: Enhance vocabulary and fluency will be increased.
CO3: Gain the ability to communicate confidently in various situations.
CO4: improve listening, speaking, reading and writing skills.
CO5: Overcome their stage freight and express their views freely without hesitation.

TEXT BOOKS

1.Workbook
2. English Grammar and composition by WREN AND MARTIN
3. Contemporary English Grammar by JAYANTHI DAKSHINAMURTHY
4. English for Technical Communication by LAKSHMINARAYANA K.R
5. Effective English for Technical Communication by FARATULLAH T.M

REFERENCE BOOKS

1. 1.Objective English (Multiple choice questions with answers for competitive examinations) by Dr.B.James
2. The English Errors of Indian Students by T.L.H Smith Pearse.
3. Communication Skills by Sanjay Kumar and Pushp Lata, Oxford University Press - 2018.
4. A Textbook of English Language Communication Skills, Infinite Learning Solutions – (Revised Edition) 2020.
5. English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press 2018.
6. Technical Communication by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
7. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – 2019.
8. Practical English Usage by Michael Swan, Oxford University Press – 2016.
9. Technical Communication – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
10. Effective Technical Communication – Second Edition by M. Ashraf Rizvi, McGraw Hill Education (India) Private Limited – 2018.

SCHEME FOR EXAMINATIONS

Theory Question Paper Pattern:
CIE- Objective type (Max. marks: 30 marks)
SEE- Objective type (Max. marks: 50 marks)

MAPPING of COs with POs

Ss	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Humanities & Social Sciences
Scheme and Syllabus – OBE - CBCS – 2021 -2022

Course Title	**PROFESSIONAL WRITING SKILLS IN ENGLISH**						
Course Code	**21HST208**						
Category	**Humanities & Social Sciences (HS)**						
Scheme and Credits	No. of Hours/Week					Total Hrs./semester	Credits
	L	T	P	SS	Total		
	1	0	1	-	02	26	01
CIE Marks: 50	SEE Marks: 50		Total Max. Marks: 100		Duration of SEE: 02 Hours		

Course objective:

To implement English vocabulary at command and ensure language proficiency, to achieve better Technical writing and Presentation skills, identify the common errors in speaking and writing English. Learn better sentence structures, acquire Employment and Workplace communication skills, to learn about Techniques of Information Transfer through presentation in different levels.

UNIT I **4 hours**

Identifying Common Errors in Writing and Speaking English, Subject Verb Agreement (Concord Rules with Exercises), Common errors in Subject-verb agreement, Noun-pronoun agreement, Adjective, Adverb, Verb, Sequence of Tenses, Misplaced modifiers, Common errors in Conjunctions, Common errors in the use of Idioms and phrases.

UNIT II **6 hours**

Nature and Style of sensible writing, organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of Proper Punctuation, The Art of Condensation (Precise writing) and Techniques in Essay writing, Redundancies & Clichés.

UNIT III **6 hours**

Technical Reading and Writing Practices, Effective Technical Reading and Writing Practices, technical Reports writing and Technical Proposals Writing, Grammar – Voice (Active and Passive Voices), Reported Speech, Vocabulary – Analogies, Words Confused/Misused, Collocations

UNIT IV **5 hours**

Communication for Employment, Components of a formal letter, Formats and types of business letters, Model Letter of Application (Cover Letter) with Resume, Emails, Blog Writing and other recent communication types, Reading Skills and Reading Comprehension.

UNIT V **5 hours**

Communication at Workplace, Interpersonal Communication Skills, Non-Verbal Communication Skills (Body Language), Group Discussion and Employment Interviews, Presentation skills and Formal Presentations by Students, Dialogues in Various Situations (Practical Sessions by Students).

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student will be able to:

CO1: Identify common errors in spoken and written communication.

CO2: Get familiarized with English vocabulary and language proficiency.

CO3: Improve nature and style of sensible writing & acquire employment and workplace skills.

CO4: Improve their Technical Communication Skills through Technical Reading and Writing practices.

CO5: Perform well in campus recruitment, engineering and all other general competitive examinations.

TEXT BOOKS:

1. Workbook
2. Functional English, Cengage learning India Pvt Limited [Latest Revised Edition] - 2020.
3. Communication Skills by Sanjay Kumar and Pushp Lata, Oxford University Press - 2018. Refer it's workbook for activities and exercises – "Communication Skills – I (A Workbook)" published by Oxford University Press – 2018.
4. A Course in Technical English, Cambridge University Press – 2020.

REFERENCE BOOKS

1. Professional Writing Skills in English, Infinite Learning Solutions – (Revised Edition) 2021.
2. Technical Communication – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
3. High School English Grammar & Composition by Wren and Martin, S Chandh & Company Ltd – 2015.
4. Effective Technical Communication – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private Limited – 2018.
5. Intermediate Grammar, Usage and Composition by M.L.Tichoo, A.L.Subramanian, P.R.Subramanian, Orient Black Swan – 2016.

SCHEME FOR EXAMINATIONS

Theory Question Paper Pattern:
CIE- Objective type (Max. marks: 30 marks)
SEE- Objective type (Max. marks: 50 marks)

MAPPING of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1												
CO2												
CO3												
CO4												
CO5												
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Humanities & Social Sciences
Scheme and Syllabus – OBE - CBCS – 2021 -2022

Course Title	**HEALTH & WELLNESS**						
Course Code	**21HST109**						
Category	**Ability Enhancement Course (AE)**						
Scheme and Credits	No. of Hours/Week					Total Hrs./semester	Credits
	L	T	P	SS	Total		
	1	0	1	0	02	26	01
CIE Marks: 50	SEE Marks: 50		Total Max. Marks: 100		Duration of SEE: 02 Hours		

Course objective:

The definition of Health and quality of life will teach the learner the necessity for a balanced strength and well-being. The Determinants of Health and Wellness topics like Diet, Food & Nutrition, life style, bring the points of understanding. Physical health, mental health, Social Health, Spiritual health, etc is a point to learn. The adolescent chooses the food as per the taste rather than the usefulness. Warming up exercises, physical exercises, yogasanas, pranayama and certain aspects of personality development may help in going a long way to improve the health and personality of the youth.

UNIT I	**5 hours**
Fundamentals of Balanced Health: Health and quality of life, Definition of Health (WHO), Five Pillars of Balanced Health, Body and Mind concepts, Disease and Healing, Genetics & Environment.	
UNIT II	**4 hours**
Determinants of Health and Wellness: Lifestyle and Health, Sleep and health, Relaxation and Meditation, Physical Fitness and Stamina, Reproductive health and hygiene.	
UNIT III	**7 hours**
Seven dimensions of Health & Wellness: Physical health, Mental health, Social Health, Spiritual health, Cultural health, Moral health, Economical health.	
UNIT IV	**5 hours**
Healthy Eating- Diet and Nutrition: Food and Diet – Difference, Concept of DIET, Nutrition.	
UNIT V	**5 hours**
Physical activity and personality Development: Warming up exercise, Physical exercise, Yogasanas, Pranayama etc. Special training for the challenged students A few words on personality development (personal quality).	
TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, videos	

COURSE OUTCOMES: On completion of the course, student will be able to:

CO1: Understand the necessity for a balanced health and well-being.
CO2: Know one's life style, physical fitness and stamina.
CO3: Differentiate types of health.
CO4: understand 'Food is medicine' or 'Medicine is food' concept.
CO5: Have the knowledge of yogasanas & pranayama for an overall personality.

TEXT BOOKS

1. Dixit Suresh (2006) Swasthya Shiksha Sports Publications, Delhi.
2. Pinto John and Ramachandra K (2021) Kannada version " Daihika Shikshanada Parichaya", Louis Publications, Mangalore.

REFERENCE BOOKS

1. Simplified Physical Exercises, Thathvagnani, The World Community Service Center, Vethathiri Maharshi, Vethathiri Publications, Erode, SKY Yoga.
2. Puri K. & Chandra S.S (2005) "Health & Physical Education', Surjeet Publication, New Delhi.
3. Shanti K.Y (1987) "The Science of Yogic Breathier" Pranayama D B Bombay.S.

SCHEME FOR EXAMINATIONS

Theory Question Paper Pattern:
CIE- Objective type (Max. marks: 30 marks)
SEE- Objective type (Max. marks: 50 marks)

MAPPING of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1												
CO2												
CO3												
CO4												
CO5												
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Civil Engineering
Scheme and Syllabus – OBE - CBCS – 2021 -2022

Course Title	**RURAL DEVELOPMENT ENGINEERING**						
Course Code	**21CVT109/209**						
Category	**Ability Enhancement Course (AE)**						
Scheme and Credits	No. of Hours/Week					Total Teaching Hours	Credits
	L	T	P	SS	Total		
	1	**0**	**0**	**0**	**1**	**13**	**1**
CIE Marks: 50	**SEE Marks: 50**		**Total Max. Marks: 100**		**Duration of SEE: 02 Hours**		

Course Objectives: Describe the scope of Rural Development Planning and Concept of Appropriate Technology and implementation of various national policies. Understand the need and concept of low-cost construction materials for individual and group housing; Illustrate the concept of Water Supply and Rural Sanitation. Interpret the concept of rural transport system and issues related to it. Summarize the need of effective Watershed and catchments area development methods and problems relating to watershed management, watershed structures.

UNIT I **3 Hours**

Rural Development Planning and Concept of Appropriate Technology:
Scope; development plans; various approaches to rural development planning; concept of appropriate technology. Rural development program / projects.

UNIT II **3 Hours**

Rural Housing:
Low-cost construction materials for housing; Composite material - ferro-cement & fly ash, soil-stabilized un-burnt brick; Water-proof and fire-retardant roof treatment for thatch roofs. Pre-cast stone masonry; rat-trap bond for walls; Panels for roof, ferro-cement flooring / roofing units.

UNIT III **3 Hours**

Rural Water Supply and Sanitation:
Sources of water. BIS & WHO water standards. Quality, Storage and distribution for rural water supply works; low-cost water treatment technologies; conservation of water; rainwater harvesting; drainage in rural areas, septic tank; low-cost community & individual Garbage disposal systems

UNIT IV **3 Hours**

Rural Transportation System:
Categories of Pavement Layers, Types of roads, Surface Treatments for roads in rural areas. Soil Stabilization, Lime, Lime Fly ash and Cement Treated Course.

UNIT V **3 Hours**

Irrigation Techniques: Consideration of low-cost irrigation techniques, drip & sprinkler irrigation systems. Watershed and catchments area development - problems and features of watershed management, watershed structures

COURSE OUTCOMES: The students will be able to,

CO1: Understand the concepts and relative Technology for implementation of various National Policies relating to Rural Development in the Country

CO2: Apply the knowledge for Designing and selection of the Construction Materials for Rural Housing

CO3: Analyze and Conceptualize Rural Water Supply and Rural Sanitation.

CO4: Evaluate and interpret the aspects of Rural Transport System

CO5: Appraise and Evaluate the effectiveness of Watershed and Catchment Management for Modern Irrigation System

TEXT BOOKS:

1. Rural Development by Katar Singh, SAGE Publication
2. A.G.Madhov Rao, D.S.Ramachandra Murthy, Appropriate Technologies for low cost Housing Oxfordand IBH Publishing Co. Pvt .Ltd.

REFERENCE BOOK(S):

1 Rural Infrastructure by P.Nair, SBS Publication
2 Rural Infrastructure by Samalia Bihari Verma, Gyaneshwar Prasad & Sahib Kumari Singh, Sarup & Sons.
3 C. Satyanarayana Murthy, Design of Minor Irrigation and Canal Structures. Wiley Eastern Ltd.,
4 Document on Rural Road Development in India Volume1& 2; Central Road Research Institute, New Delhi.

ONLINE RESOURCE:

1. http://www.nptel.ac.in
2. https://en.wikipedia.org

MAPPING of COs with POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	√	√				√	√					
CO2							√					
CO3			√				√					√
CO4							√					
CO5					√		√					√

Dr Ambedkar Institute of Technology, Bengaluru-56
Career Guidance and Placement Cell
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**Career Development Skills - I**						
Course Code	**21HSN110**						
Category	HSS (Humanities)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	01	00	01*	00	02	26	00
CIE Marks: 50	**SEE Marks: -**		**Total Max. marks=50**		**Duration of SEE: NIL**		

COURSE OBJECTIVE:

1. The lessons under this unit are designed to enable the students to plan their career on correct measures and motivate them to set their goals on prior basis.
2. This unit aims to develop the personality skills of the students and teach them to lead a corporate discipline nurture. It also helps them to get groomed with professional ethics.
3. This unit is designed to give the awareness to the students about the job market to prepare themselves at their own pace and potential. It also teaches them about the self-developing attitude through their emotions and intelligence.
4. This unit complies with the overcoming ability of students dealt in stress and it also teaches the punctuality and time managing.
5. This lesson will help students make inferences and predictions about spoken, writing & listening discourse. And by utilizing digital literacy tools, their LCRW skills can be enhanced.

Unit no	Syllabus content	Hours/COs
1	1. Career Planning 2. Goal Settings	5 CO1
2	1. Personality Effectiveness 2. Building Personality and Discipline 3. Grooming, hygiene and Cleanliness	6 CO2
3	1. Self- Awareness & Self Confidence 2. Attitudes 3. Emotional & Intelligent Quotient	6 CO3
4	1. Time Management 2. Stress Management	4 CO4
5	1. LICRW Skills (Listening, Interpersonal, Conversation, Reading & Writing skills)	5 CO5

COURSE OUTCOME:

1. The students will be able to learn about the overview of their goals and also gets to know diversities in the field of their career planning.
2. The student will develop and improve their personal and professional effectiveness. At the end of this unit, students will have deploy themselves about the corporate culture.
3. At the completion of this unit, students will develop the self-confidence and emerge as the confident person.
4. After the completion of this unit students will understand the stress, time and emotional management. Also they will learn about the overcoming the fear and uncomfortable situations such as Public speaking.
5. After the completion of this unit, students will gain knowledge about the assertiveness of Listening, Reading, Writing & Interpersonal segments.

REFERENCE:

1. Soft skills for Managers by Dr. T. KALYANA CHAKRAVATHI
2. Personal Development and Soft Skills by BARUN K MITRA, Oxford Higher Education
3. The Emotionally Intelligent Workplace by DANIEL GOLEMAN.
4. Communication skills and soft skills an integrated approach by E. SURESH KUMAR, P. SREEHARI, J SAVITHRI.
5. Top Talking in English (international communication skills) by CHARLES T. RAJENDRA
6. Soft skills by RAJ LAKSHMI SURYAVANSHI, Gurucool Publishing

Dr Ambedkar Institute of Technology, Bengaluru-56
Career Guidance and Placement Cell
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**Career Development Skills - II**						
Course Code	**21HSN210**						
Category	HSS (Humanities)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	01	00	01*	00	02	26	00
CIE Marks: 50	**SEE Marks: -**		**Total Max. marks=50**		**Duration of SEE: NIL**		

COURSE OBJECTIVE:

1. The main goal of this unit is to help students to overcome the fear of speaking in both personal and professional culture and it also focuses on the presenting the topics with confidence. This unit also teaches the students about the team building activities
2. This unit depicts the easier decision making and problem solving techniques for overcoming the hardships of interview process. It also teaches on behavior & mannerism that should be maintained during the interview.
3. The lessons under this unit help students' to learn to business communication activities which sought to help them to become an entrepreneur.
4. This unit deals with the preparation of Interview skill and also teaches the students about the various interview structures like Resume Building, GD etc..
5. This unit is completely an activity session, constructed to overcome the stage presence or fear.

Unit no	Syllabus content	Hours/COs
1	1. Presentation Speaking skills 2. Public Speaking skills 3. Team Building	**5** **CO1**
2	1. Decision Making & Problem Solving 2. Mannerism & Behavior 3. Reaching your potential	**5** **CO2**
3	1. Business Communication 2. Sales & Negotiations 3. Customer Service	**5** **CO3**
4	1. Interview Skills 2. Resume Building 3. Group Discussion (Each student will be assessed based on their body language, voice modulation, content & Creativity	**6** **CO4**
5	1. Activity Sessions > Debate > Picture Connector 2. Mock Interview	**5** **CO5**

COURSE OUTCOME:

1. The students will have learnt about the way of quality communication with the co-workers and it will also help to build a strong social relationship with outside society. And students will also learn to deliver the presentation in a more powerful and persuasive way.

2. At the end of this unit, students will have deploy themselves in the active thinking and also learns about the effective usage of words. And students will learn about the synchronization with the workmate and also gives them an opportunity to unlock their individual potentials.

3. After the completion of this unit, student will have learnt how to undergo business etiquettes with proper negotiations and customization.

4. After the completion of this unit student have learnt about the interview standards that being asked during the recruitment process. It also improves the clarity and confidence of the students.

5. At the end of this sessions, students will be confident on their speech and will be exposed to interview standards that being asked during the recruitment process.

REFERENCE:

1. Soft skills for Managers by Dr. T. KALYANA CHAKRAVATHI
2. Personal Development and Soft Skills by BARUN K MITRA, Oxford Higher Education
3. The Emotionally Intelligent Workplace by DANIEL GOLEMAN.
4. Communication skills and soft skills an integrated approach by E. SURESH KUMAR, P. SREEHARI, J SAVITHRI.
5. Top Talking in English (international communication skills) by CHARLES T. RAJENDRA
6. Soft skills by RAJ LAKSHMI SURYAVANSHI, Gurucool Publishing
7. Enhancing English and Employability Skills by State Board of Technical.
8. Soft skills an integrated approach to maximize personality by SANGEETHA SHARMA, GAJENDRA SINGH CHAUHAN, and Wiley Publishing.

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Chemistry
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**ENGINEERING CHEMISTRY**						
Course Code	**21CHT102/202**						
Category	Basic Science Course (BS)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	03	00	00	00	03	40	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVE: To expose first year engineering students to various physicochemical aspects of engineering materials such as metals, alloys, plastics, conducting polymers etc. with a view to highlight their significance and importance in application oriented systems.

UNIT I **8 hours**

Electrochemical energy sources:

Electrochemical cells

Introduction to electro chemical cells, origin of single electrode potential, sign convention and cell notation, standard electrode potential, derivation of Nernst equation for single electrode potential, numerical problems.

Types of electrodes- Classification of reference electrodes, calomel electrode – construction, working and applications, Measurement of single electrode potential using calomel electrode, Electrochemical series, Concentration cells -Derivation of Emf of a concentration cell - numerical Problems. Ion selective electrodes – Glass electrode – construction and working, Determination of pH of a solution using glass electrode.

Batteries and fuel cells

Basic concepts – principal components of a battery, operation of a battery during charging and discharging, Battery characteristics – voltage, capacity, energy efficiency, cycle life and shelf life. Classifications of batteries, Construction, working and applications of Lead acid, Ni-metal hydride and Li-ion battery, significance of Lithium.

Fuel cells – Construction, working and applications of CH_3OH-O_2 fuel cell using H_2SO_4 electrolyte.

Self-study : Introduction to Refrence electrode, Ag-AgCl electrode, Introduction to fuel cells & battery, H2-O2 Fuel cell.

UNIT II **8 hours**

Corrosion and Metal finishing

Corrosion science

Corrosion – Introduction, electrochemical theory of corrosion, galvanic series: Types of corrosion – Differential metal corrosion –Differential aeration corrosion, Stress corrosion. Factors – Related to nature of metal: electrode potential, relative sizes of anode and cathode, nature of the corrosion product. Related to environment: pH of the medium, temperature, humidity and presence of impurities in the atmosphere.

Corrosion control: Inorganic coatings; Anodizing – anodized coating of aluminium. Phosphating. Metallic coatings – Anodic metallic coating ex : Galvanizing, Cathodic metallic coating ex : Tinning .Organic coatings –examples, Corrosion inhibitors – definition, anodic and cathodic inhibitors, Cathodic protection – definition, sacrificial anode method.

Metal finishing

Technological importance, Electroplating – pre-treatment, process.

Significance of Polarization, Decomposition potential and Overvoltage in electroplating and their applications. Effect of plating variables on the nature of electrodeposit – metal ion concentration, organic additives (Complexing agents, brighteners, levelers, structure modifiers and wetting agents), current density, pH, temperature and throwing power of the plating bath, Electroplating of chromium.

Electroless plating: difference between electroplating and electroless plating. Pre-treatment and activation of the surface, electroless plating of copper in the manufacture of PCBs.

Self-study : Metallic coating : Anodic metallic coating- Galvanization, Cathodic metallic coating- Tinning, Organic coating

UNIT III **8 hours**

Energy: Sources & Conversion

Chemical fuels: Hydrocarbon fuels, classification. Calorific value –GCV and NCV. Bomb calorimeter, numerical problems.

Petroleum cracking – Fluidized catalytic cracking process, Knocking – mechanism and harmful effects, Octane and Cetane numbers, Reforming of petrol. Unleaded petrol, power alcohol, Biodiesel, Catalytic converters – construction and working.

Solar energy: Photovoltaic cells – Introduction, definition, production of solar grade silicon, purification of silicon by zone refining process, construction and working of silicon-photovoltaic cell, advantages and disadvantages.

Self-study : Determination of GCV & NCV of gaseous fuel by Buoys calorimeter and numerical problems.

UNIT IV **8 hours**

Polymer science and Environmental Pollution

Polymer science

Polymerization – Classification- addition and condensation polymerization with examples: Techniques of polymerization- bulk, solution, emulsion and suspension polymerization. Free radical mechanism taking ethylene as an example, Glass transition temperature (Tg) –significance and factors affecting Tg, compounding of resins into plastics. Synthesis and applications- PMMA, Polyurethane, phenol-formaldehyde resin. Elastomers: Introduction, vulcanization of rubber. Synthesis and applications of neoprene and butyl rubber; adhesives: synthesis of epoxy resins. Conducting polymers: mechanism of conduction in polyacetylene and its applications.

Environmental Pollution: Introduction, Air pollutants: Sources and effects of primary & Secondary air Pollutants, Ozone depletion, greenhouse effect - global warming. Sources of water pollution, Determination of BOD and COD

Self-study : Characterization of nanomaterials- FT-IR, XRD, SEM, TGA, BET-surface area analysis.

UNIT V **8 hours**

Instrumental methods of chemical analysis: theory, instrumentation and applications- Colorimetric estimation of Cu, Potentiometric estimation of FAS, Conductometric estimation of acid mixture.

Water technology

Impurities in water –water analysis: Hardness – types, determination by EDTA method, dissolved oxygen by Winkler's method.

Potable water- desalination of water by electrodialysis method.

Green chemistry: Introduction, Principles, green synthesis – Aspirin and ibuprofen
Green catalyst – Zeolite and Silica. Microwave assisted reaction in water – Methyl benzoate to Benzoic acid, oxidation of toluene, Ultrasound assisted reaction – Sonochemical simmons-smith reaction

Self –study: Importance of green chemistry in industry, environment related issues.

TEACHING AND LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

Course Outcomes:

1. CO1: At the end of the first unit the student will be able to understand the basic concepts electrochemistry and its applications, in the construction of electrochemical energy sources.

2. CO2: At the end of the second unit the student will be able to understand concepts of corrosion and its control in the fabrication and design of structural materials and importance of metal finishing in enhancing physicochemical properties.

3. CO3: At the end of the third unit the student will be able to understand concepts of renewable and non-renewable energy sources.

4. CO4: At the end of the fourth unit the student will be able to understand the application of polymeric materials for different applications.

5. CO5: At the end of the fifth unit the student will be able to understand the instrumental techniques and water quality parameters.

REFERENCE:

1. Principles of Physical Chemistry B.R.Puri, L.R.Sharma & M.S.Pathania, S.Nagin Chand &Co.
2. Text Book of Polymer Science by F.W.Billmeyer, John Wiley & Sons
3. Corrosion Engineering – by M.G.Fontana, Mc Graw Hill Publications.
4. Environmental Chemistry by Stanley E. Manahan, 7th Edition, lewis Publishers, 2000
5. Engineering Chemistry by Dr Renu bapna, Macmilan publisher India limited
6. Engineering Chemistry by Jayaprakash and Venugopal Subhash Publications.
7. Nano Metal Oxides For Environmental Remediation. United Publications Dr. Jahagirdar A.A and Dr. Nagaswarupa H P

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Computer Science & Engineering
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**PROBLEM SOLVING THROUGH PROGRAMMING**						
Course Code	**21CST103/203**						
Category	Engineering Science Course (ES)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	03	00	00	00	03	40	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVES:

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

UNIT I **10 hours**

Fundamentals of Problem Solving:
Art of programming through Algorithm and Flowchart, Designing solutions to various problems.
Overview of C: Basic structure of C program, executing a C program. Constant, variable and data types, Operators and expressions
Self Study Component: Introduction to Computer: Computer generations, computer types, CPU, Primary memory, Secondary memory, input devices, output devices.

UNIT II **10 hours**

Managing Input and output operations: Conditional Branching and Loops: Example programs, finding roots of a quadratic equation, computation of binomial coefficients, plotting of Pascal's triangle.
Self Study Component: Hardware and Software: Computers in a network, Network hardware, Software basics, software types.

UNIT III **11 hours**

Arrays: Arrays (1-D, 2-D), Character arrays and Strings, Basic Algorithms: Searching and Sorting Algorithms (Linear search, Binary search, Bubble sort and Selection sort).
Self Study Component: Programming Examples

UNIT IV **10 hours**

User Defined Functions and Recursion.
Example programs: Finding Factorial of a positive integer, GCD of two numbers and Fibonacci sequence.
Self Study Component: Storage classes: auto, extern, static, register.

UNIT V **11 hours**

Structures, Unions and Pointers, Programs like Addition of two complex numbers using structures, compute the sum, mean and standard deviation of all elements stored in an array of N real numbers using pointers.
Self Study Component: Case Study related to Functions and Structures :

Example: ***Implement structures to read, write and compute average marks and the students scoring above and below average marks for a class of 'N' students with the structure definition as***

```
struct student
{
        char name[20];
        int rollno;
        int m1, m2, m3;
        int avg;
}
```

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student should be able to:

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

CO1: Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts.

CO2: Apply programming constructs of C language to solve the real world problem

CO3: Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting

CO4: Explore user-defined data structures like structures, unions and pointers in implementing solutions

CO5: Design and Develop Solutions to problems using modular programming construct Using functions

TEXT BOOKS

1. E. Balaguruswamy, "Programming in ANSI C", 7th Edition, Tata McGraw-Hill

2. Brian W. Kernighan and Dennis M. Ritchie, "The 'C' Programming Language", Prentice Hall of India.

REFERENCE BOOKS

1. "Programming in C" by Reema Thereja, , Cengage publication.
2. "C- Programming Techniques" by A.M. Padma Reddy, Sri Nandi Publications

ONLINE RESOURCES

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

SCHEME FOR EXAMINATIONS

Theory Question Paper Pattern:

1. Answer ANY ONE from Question No. 1 and 2

2. Answer ANY ONE from Question No. 3 and 4

3. Answer ANY ONE from Question No. 5 and 6

4. Answer ANY ONE from Question No. 7 and 8

5. Answer ANY ONE from Question No. 9 and 10

MAPPING of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2		2	-	-	-	-	-	-	-
CO2	3	3	3	2	3	-	-	-	-	-	-	-
CO3	3	2	2	3	3	-	-	-	-	-	-	-
CO4	3	2	2	3	-	-	-	-	-	-	-	-
CO5	3	3	3	2	3	-	-	-	-	-	-	-
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Electronics and Communication Engineering
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**BASIC ELECTRONICS AND COMMUNICATION ENGINEERING**						
Course Code	**21ECT104/204**						
Category	Engineering Science Course (ES)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	02	02	00	00	03	52	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVES:

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

UNIT I **11 hours**

Electronic Circuits: Rectifiers, Reservoir and smoothing circuits, Full-wave rectifiers, Bi-phase rectifier circuits, Bridge rectifier circuits, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers, Power Supplies–Block diagram, (No Derivations, Numericals on Rectifiers included).

Amplifiers: Types of amplifiers, Class of operation, Input and output resistance, Frequency response, Bandwidth, Phase shift, Negative feedback.

Operational amplifiers: Operational amplifier parameters, Operational amplifier characteristics, Operational amplifier configurations, Operational amplifier circuits, Multi-stage amplifiers.

Oscillators: Positive feedback, Conditions for oscillation, Ladder network oscillator, Wein bridge oscillator. (No Derivations, Numericals on Op-amp included). **Text 1**

Self-study component: BJT types, comparison of BJT, FET & FinFET.

UNIT II **11 hours**

Logic Circuits: Boolean Algebra, Logic gates, Realization of Boolean Expressions using basic gates and their truth table.

Half Adder and Full Adder, Multiplexer and decoder. Shift registers and its types – operation and truth table, Counters and asynchronous counters. Bistables, R-S Bistables, D-type Bistables, J-K Bistables. **Text 4**

Data representation, Data types, Data storage, A microcontroller system.

Sensors and Interfacing: Instrumentation and control systems, Transducers, Sensors. **Text 1**

Actuators, LED, 7-Segment LED Display, Optocoupler, Stepper Motor, Relay, Piezo Buzzer, Push Button Switch, Keyboard. **Text 2**

Self-study component: Actuator types, LCD, Touch screen displays

UNIT III **10 hours**

Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC, Harvard vs Von-Neumann, Big- Endian vs Little-Endian, Memory, Program storage memory (ROM), RAM, Embedded firmware, other system components. **Text 2**

Communication Interface: UART, Parallel Interface, USB, Bluetooth, Wi-Fi, GPRS. **Text 2**

Self-study component: Block diagrams of the architectures of RISC, CISC, Harvard and Von-Neumann.

UNIT IV **10 hours**

Analog and Digital Communication: Modern communication system scheme, Information source and input transducer, Transmitter, Channel – Hardware and Software, Noise, Receiver, Multiplexing, Types of communication systems. **Text 3**

Types of modulation (only concepts) – AM, FM, Phase Modulation, Pulse Modulation, PAM, PWM, PPM, PCM. Concept of Radio wave propagation. Concepts of Sampling theorem, Nyquist rate, Digital Modulation Schemes– ASK, FSK, PSK

Self-study component: Evolution of Wireless Network Communication Technologies (1G, 2G, 3G and4G, 5G).

UNIT V **10 hours**

Data Transmission: Asynchronous Transmission, Synchronous Communication, Data Compression, Encryption.

Radio Waves, Antennas, Satellite Communication, Microwave Communication, Optical Fiber Communication (OFC): Block diagram of OFC, Advantages of OFC, Applications of OFC. **Text 4**

Cellular Wireless Networks - Introduction, cellular telephone system, cellular concept and frequency reuse. **Text 3**

Self-study component: **Co-ordination number, Atomic packing factor (APF) for simple cubic, body centered and face centered cubic structure. Applications of nanomaterials: Medical and Electronics.**

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: Describe the concepts of electronic circuits encompassing power supplies, amplifiers and oscillators.

CO2: Explain the concepts of digital logic circuits, sensors, actuators and I/O subsystems.

CO3: Discuss the characteristics of embedded systems and types of communication interface.

CO4: Describe the fundamental concepts of analog communication, digital communication and radio wave propagation.

CO5: discuss the techniques of data transmission, different modes of communication, wired and wireless communication systems.

TEXT BOOKS

1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4thEdition, Elsevier, 2015. DOI https://doi.org/10.4324/9781315737980. eBook ISBN9781315737980
2. K V Shibu, 'Introduction to Embedded Systems', 2nd Edition, McGraw Hill Education (India), Private Limited, 2016.
3. S L Kakani and Priyanka Punglia, 'Communication Systems', New Age International Publisher, 2017. https://elib4u.ipublishcentral.com/pdfreader/communication-systems
4. D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India), Private Limited, 2018.

REFERENCE BOOK

1. **Mitchel E. Schultz, 'Grob's Basic Electronics', 11th Edition, McGraw-Hill, 2011.**

ONLINE RESOURCES

1. https://onlinecourses.nptel.ac.in/noc21_ee55/preview

MODERN TOOLS:

1. PSPICE

MAPPING of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	1		1			2	1	1		3
CO2	3	2	1					2	1	1		3
CO3	3							2	1	1		3
CO4	3							2	1	1		3
CO5	3							2	1	1		3
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Mechanical Engineering
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**ELEMENTS OF MECHANICAL ENGINEERING**						
Course Code	**21MET105/205**						
Category	Mechanical						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	02	00	02	00	03	40	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. Marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVE:

1. Acquire a basic understanding role of Mechanical Engineering in the industry and society, formation of steam and its industrial application, renewable energy resources and basic concepts of Hydraulic turbines.
2. Acquire knowledge on automobile technology in transport application and basics of Refrigeration and Air-Conditioning.
3. Acquire knowledge of various engineering materials, and metal joining techniques.
4. Acquire essential experience on basic Power transmission systems and Robotics.
5. Acquire knowledge of basic concepts on manufacturing principles and machine tools and their advancement.

UNIT 1 **10 hours**

Introduction to Mechanical Engineering (Overview only):
Role of Mechanical Engineering in Industries and Society

Sources of energy: Classification, renewable and non- renewable sources of energy and comparison.

Steam: Steam formation at a constant pressure: properties of steam, simple numerical problems to understand the use of steam tables. Applications of steam in industries.

Power generating systems: Introduction, construction and working of: Steam turbines – Impulse and reaction turbine, Gas turbines – Open and closed cycle, Hydraulic turbines – Pelton wheel, Francis and Kaplan turbine.

Power absorbing systems: Introduction, classification of pumps and compressors.

Self-study:

Harnessing of renewable energy sources: Wind energy, Solar energy, Bio-mass and their applications

Boilers- Introduction, classification of boilers, difference between fire tube and water tube boilers.

Laboratory Components:

1. Study/Visit any one Conventional or Renewable Energy Power Plant and prepare a comprehensive report.

2. *Demonstration of Components of any one Turbo-machine.*

3. *Study/Visit to an Industry using steam for their process and prepare a comprehensive report.*

UNIT 2 **10 hours**

Internal combustion engines: Introduction, classification, parts and terminology of I C engines, working of 4-stroke petrol & diesel engines, simple numerical problems on four stroke engines. Applications of IC engines.

Hybrid and Electrical vehicles: Introduction, basic working principle of electrical and hybrid vehicles.

Refrigeration and Air conditioning- Introduction, definition and unit of refrigeration. Refrigerants and their properties. Types of refrigeration systems- Vapour absorption and Vapour compression refrigeration systems

and their comparison. Principle & working of room air conditioner. Applications of Refrigerators and Air conditioning system.

Self-study:

Engines: Two stroke petrol and diesel engines, emission norms.

Laboratory Components:

1. Study of Engine Components through Cut Sections

2. *Demonstrate Components and Working principles of Domestic Refrigerator and prepare a comprehensive report* ***OR*** *Study/visit any commercial centralized Air-Conditioning unit, understand various components and operations, and prepare a comprehensive report.*

UNIT III **10 hours**

Engineering Materials: Types and applications of ferrous, nonferrous metals and alloys. Composite Materials: Introduction, classification and applications.

Heat treatment: Introduction to heat treatment, Types of Heat Treatment: Annealing, quenching, carburizing, and hardening.

Metal Joining Processes:

Soldering and brazing: Definition, types, advantages, limitations and applications of soldering and brazing. Working principle of soldering iron and torch brazing methods.

Welding: Introduction, classification and applications of welding. Working principle of electric arc welding and oxy-acetylene gas welding. Introduction to TIG and MIG welding.

Self-study:

Engineering materials: Polymers, Ceramics, Bio materials, Smart materials and its engineering applications.

Laboratory Components

1. One exercise each involving Welding, Soldering, and Brazing.

2. *Study oxy-acetylene gas flame structure and its application to gas welding*

3. Demonstration of ***anyone*** *Heat transfer application device and prepare a comprehensive report*

UNIT IV **10 hours**

Power transmission:

Belt drives – Introduction, types of belts and belt drive. Terminology - velocity ratio, creep and slip.

Gear drives - Introduction, classification; Gear trains – types of gear train. Simple numerical problems on gear drives.

Robotics: Robot anatomy, Joints & links, common Robot configurations. Applications of Robotics in Material Handling, Processing, Assembly, and Inspection.

Self-study:

Power transmission: Rope drives, Chain drives and Pulleys.

Laboratory Components:

1. *Demonstration of the machine consists of Gear Trains*
2. *Demonstration of various elementary mechanisms and their motion.*
3. *Demonstration of any one model of Robot*

UNIT V **10 hours**

Manufacturing process: Introduction and classification of manufacturing process.

Machine tools: Lathe -Working principle and specification of center lathe. Sketch and description of operations performed – turning, facing, knurling, thread cutting, drilling, taper turning. Construction and Working of Milling Machines and applications.

Introduction to Mechatronics: Concept of open-loop and closed-loop systems, Examples of Mechatronic systems and their working principle.

Rapid prototyping (3D printing) - Definition, Classifications, Advantages, Disadvantages, Applications, Brief introduction of 3D Printers -SLA, SLS, FDM.

Self-study:

Introduction to Modern Manufacturing Tools and Techniques:

CNC: Introduction, components of CNC, advantages and applications of CNC, CNC Machining centres and Turning Centers.

Laboratory Components:

1. Demonstration of developing one model involving Lathe, Milling and Drilling

2. Study/Visit an Industry using CNC/ modern techniques and submit a report.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

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COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: **Demonstrate** the working of various power generation devices such as steam, gas, hydraulic turbines and power absorbing devices like air compressors.

CO2: **Analyze** about the various IC engines, and power absorbing devices such as refrigerators and air conditioning.

CO3: **Describe** the engineering materials, heat treatment, joining processes for various applications.

CO4: **Describe** power transmission methods for various applications.

CO5: Demonstrate the principle, application of various basic and advanced manufacturing processes.

TEXT BOOKS

1. Elements of Mechanical Engineering - K.R. Gopalkrishna, Subhash publishers, Bangalore.
2. A Text Book of Elements of Mechanical Engineering – S. Trymbaka Murthy I. K. International Pvt Ltd, 2010 - Mechanical engineering
3. Elements of Mechanical Engineering – Dr. A.S. Ravindra, Best Publications, 7th edition, 2009.
4. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1.
5. Material Science, by Raghavan, Fifth Edition,PHI(P)LTD.

REFERENCE BOOKS

1. Elements of Workshop Technology. Vol 1 & 2, S.K.H. Chowdhary, A.K.H. Chowdhary and Nirjhar Roy, 11th edition 2001, Media Promoters and Publishers, Mumbai.
2. Hand books of Mechanical Engineering.
3. Material science, by Callister, Reprint 2008,Wiley India(P) LTD

ONLINE RESOURCES

1. http://www.nptel.ac.in
2. https://en.wikipedia.org
3. https://mechanicalengineeringworld.com/

Assessment Details both (CIE and SEE)
The weightage of Continuous Internal Evaluation (CIE) and Semester End Exam (SEE) is 50% each. The students have to obtain a minimum of 40% marks individually both in CIE and SEE to pass. **CIE:** The CIE has two components – CIE - theory component and CIE – laboratory component. Students have to score a minimum of 40% Marks in the total of CIE - theory and CIE – laboratory components put together, provided students have to score a minimum of 40% marks in CIE laboratory component alone to qualify to take SEE. Theory Semester End Exam (SEE) is conducted for 100 marks (3 Hours duration) and reduced to 50%.

CONTINUOUS INTERNAL EVALUATION (CIE)		**Max Marks**		**Minimum Marks to be scored in CIE, to qualify to take SEE (40% individually)**
Theory	**Weightage of CIE1 and CIE2 Tests**	**20**	**30**	**12**
	Any **two *Activities*-** namely activities, quizzes, assignment, seminar/ presentation, mini- project leading to demonstration.	**10**		
Laboratory components	**Lab demonstration components:** Rubrics for each Experiment taken average for all lab components (more emphasized on demonstration topics).	**15**	**20**	**08**
	Viva-Voce	**05**		
TOTAL		**50**		**20**

QUESTION PAPER PATTERN (SEE)										
Q. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
UNIT	1		2		3		4		5	
1. Two full questions (each of 20 Marks) are to be set from each unit.										
2. Student shall answer five full questions selecting one full question from each unit.										

MAPPING of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	1	1	2	2	1	1	1	1	3
CO2	3	2	2	1	1	2	2	1	1	1	1	3
CO3	2	1	1	1	2	2	2	1	1	1	1	3
CO4	3	1	2	1	2	2	2	1	1	1	1	3
CO5	3	1	1	1	1	2	2	1	1	1	1	3
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Chemistry
Scheme and Syllabus - CBCS – 2021 -2022

Course Title	**ENGINEERING CHEMISTRY LABORATORY**						
Course Code	**21CHL106/206**						
Category	Basic Science Course (BS)						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	00	00	02	00	02	12	01
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

COURSE OBJECTIVE: To expose first year engineering students to various experimental technique related to potentiometric, conductometric, colourimetric and PKa with a view to highlight their significance and importance in application oriented systems. Students will be able to analyze hardness of water, COD of waste water.

Sl. No.	**Syllabus content**
	PART-A
1	Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.
2	Colorimetric determination of Copper.
3	Conductometric estimation of acid mixture using standard NaOH solution.
4	Determination of pKa of a weak acid using pH meter.
5	Determination of viscosity coefficient of a given liquid using Ostwald's viscometer.
6	Flame photometric estimation of Sodium and Potassium in the given sample of water. (Demonstration)
	PART-B
7	Determination of Total Hardness of water using disodium salt of EDTA.
8	Determination of Calcium Oxide in the given cement by Rapid EDTA method.
9	Determination of percentage of Copper in the given brass solution using standard Sodium thiosulphate solution.
10	Determination of Iron in Hematite ore solution using Potassium dichromate crystals by external indicator method.
11	Determination of Chemical Oxygen Demand of the given industrial waste water sample.
12	Determination of Total Alkalinity of given water sample using standard Hydrochloric acid.(Demonstration)

Course Outcomes:

1. Students will be able to apply the basic concepts electrochemistry in experiments such as potentiometry and determination of PKa of weak acid, conductometry experiments etc

2. Students will be able to understand concepts of electromagnetic radiation and perform coulorimetric experiments.
3. Students will be able to analyze the total hardness of water sample and COD of the wastewater
4. Students will be able to analyze the hematite ore in the given sample.

References Books:

1. Laboratory manual in Engineering Chemistry Sudharani, Dhanpatrai Publishing Company.
2. Vogel's Text Book of Quantitative Chemical Analysis revised by G.H.Jeffery, J.Bassett, ,J.Mendham and R.C Denney.

VIRTUAL LAB LINK DETAILS:

- https://www.labster.com/chemistry-virtual-labs/
- https://youtu.be/OwZbw6Mhrqc
- https://youtu.be/UOLOsKZxi6Y

SCHEME FOR EXAMINATIONS

MAPPING of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												
Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Computer Science and Engineering
Scheme and Syllabus – OBE - CBCS – 2021 -2022

	COMPUTER PROGRAMMING LABORATORY						
Course Code	**21CSL107/207**						
Category	Engineering Science Course (ES)						
Scheme and Credits	No. of Hours/Week					Total Hrs./semester	Credits
	L	T	P	SS	Total		
	0	0	2	0	2	26	1
CIE Marks: 50	SEE Marks: 50		Total Max. Marks: 100		Duration of SEE: 03 Hours		

Course objectives to:

- Explain problem statements and identify appropriate solutions
- Demonstrate the use of IDE, C Compiler, and identify and rectify the syntax and syntactic errors during programming.
- Development of algorithms and programs using constructs of C programming language
- Reporting the observations

Practice Programs	
1.	To calculate simple interest (SI) for a given principal (P), time (T), and rate of interest (R) (SI = P*T*R/100).
2.	To print the ASCII value of the given input.
3.	To find largest of three numbers.
4.	To perform simple calculator using switch case statement.
5.	To find factorial of a number.
6.	To print even and odd numbers using looping Construct.
7.	To find sum of N natural Numbers
8.	Write a C Program to search for the given key element with the help of Linear search technique.
9.	Develop a c program to implement selection sort technique.
10.	Develop a C program to swap two numbers using pointers (Call by Reference).

Lab Programs		
1	a	Write a C program to find the roots of a quadratic equation.
	b	Write a C program to print the numbers in triangular form 1 1 2 1 2 3 1 2 3 4
2	a	Write a C program to check whether the given four digit number is palindrome or not.

<table>
<tr><td></td><td>b</td><td>Write a C program using function to sort the given array elements using bubble sort technique.</td></tr>
<tr><td rowspan="2">3</td><td>a</td><td>Develop a C program to Store age of n students and perform the following operations
i. Find minimum age of student in the list
ii. Find maximum age of a student in the list</td></tr>
<tr><td>b</td><td>Develop a C Program to compute Sin(x) using Taylor series approximation. Compare your result With the built- in Library function. Print both the results with appropriate messages.</td></tr>
<tr><td>4</td><td>a</td><td>If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss and determine how much profit or loss incurred in percentage.</td></tr>
<tr><td></td><td>b.</td><td>Write a C program to implement Recursive functions for Binary to Decimal Conversion.</td></tr>
<tr><td>5</td><td>a</td><td>Write a C program to generate N Fibonacci series.</td></tr>
<tr><td></td><td>b</td><td>Develop a C program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.</td></tr>
<tr><td>6</td><td>a</td><td>Write a C program to check whether the given number is prime or not.</td></tr>
<tr><td></td><td>b</td><td>Write a C program to
i. read N Bank Employees name
ii. Search for an employee in the list using Binary Search Technique.
Note: Use 2-D character array to store Bank employees names</td></tr>
<tr><td>7</td><td>a</td><td>Develop a C program to calculate tax based on given yearly salary and tax percentages. Read monthly salary of an employee as an input from the user.
Conditions to calculate tax, if yearly salary is:
<table>
<tr><th>Income Range</th><th>Tax Charges</th></tr>
<tr><td><=1,50,000</td><td>No tax</td></tr>
<tr><td>1,50,001 to 3,00,000</td><td>10%</td></tr>
<tr><td>3,00,001 to 5,00,000</td><td>20%</td></tr>
<tr><td>5,00,001 and above</td><td>30%</td></tr>
</table></td></tr>
<tr><td></td><td>b</td><td>Write a menu driven C Program to compute Trace and Norm of a matrix Using Functions.</td></tr>
<tr><td>8</td><td></td><td>Write C functions to implement string operations such as Compare, Concatenate and String length. Convince the parameter passing techniques.</td></tr>
<tr><td>9</td><td></td><td>Three people denoted by P1, P2, P3 intend to buy some rolls, buns, cakes and bread. Each of them needs these commodities in differing amounts and can buy them in two shops S1, S2. Which shop is the best for every person P1, P2, P3 to pay as little as possible? The individual prices and desired quantities of the commodities are given in the following tables:</td></tr>
</table>

		Demanded quantity of foodstuff: | | roll | bun | cake | bread | | P_1 | 6 | 5 | 3 | 1 | | P_2 | 3 | 6 | 2 | 2 | | P_3 | 3 | 4 | 3 | 1 | Prices in shops S_1 and S_2: | | S_1 | S_2 | | roll | 1.50 | 1.00 | | bun | 2.00 | 2.50 | | cake | 5.00 | 4.50 | | bread | 16.00 | 17.00 | **MATRIX MULTIPLICATION** Write a C program by considering 2 matrices A (M x N) and B (P x Q) that uses functions to perform the following: i. Reading data to p1, p2, p3 (Matrix A) ii. Reading data to s1, s2 (Matrix B) iii. Multiplication of Two Matrices(C=AXB)
10		Write a C Program To maintain a record of bank customer's with four fields (Customer ID, Customer Name, Address and ACC-Num). Read and display the bank customer details. Note: Using array of structures.

Note: In the practical examination the student need to select one question and both a, b (if present) should be executed. All the questions listed in the syllabus have to be included in the lots. The change of question has to be considered by deducting marks (20% of execution), provided the request is made for the same, within half an hour from the start of the examination.

Course Outcomes:

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

CO1: Define the problem statement and identify the need for computer programming
CO2: Make use of C compiler, IDE for programming, identify and correct the syntax and syntactic errors in programming
CO3: Develop algorithm, flowchart and write programs to solve the given problem
CO4: Demonstrate use of functions, recursive functions, arrays, strings, structures and pointers in problem solving.

Suggested Learning Resources:

1. Yashavanth Kanetkar, Let us C, Authentic Guide to C Programming Langauge, bpb publisher, 17th Edition, 2020.
2. Herbert Schildt, C: The complete reference, Mc Graw Hill, 4th Edition, 2017
Programming in C, Reema Theraja, Cengage publication.

Weblinks and Video Lectures (e-Resources):

1. http://elearning.vtu.ac.in/econtent/courses/video/BS/14CPL16.html
2. https://nptel.ac.in/courses/106/105/106105171/

MAPPING of COs with POs

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	**3**	**3**	**2**		**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	**3**	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO	**3**	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**