

GIET UNIVERSITY, GUNUPUR-765022

DEPARTMENT

OF

BASIC SCIENCE & HUMANITIES

(SCHOOL OF ENGINEERING & TECHNOLOGY)



BACHELOR'S DEGREE PROGRAMME

(B. Tech)

Course Structure and Syllabi

For

1st Year Students Admitted in

[2021-22]

Academic Session

SYLLABUS STRUCTURE

1ST SEMESTER (2021-25)

| Sl. No. | Course Category | Course Code | Course Title | Hours per week | | | Credits | CIA | ESE |
|------------------------------|-----------------|--------------|---|----------------|---|---|-----------|-----|-----|
| | | | | L | T | P | | | |
| | | | THEORY | | | | | | |
| 1 | BS | 21BBSBS11001 | Engineering Mathematics-I | 3 | 1 | 0 | 4 | 30 | 70 |
| 2 | BS | 21BBSBS10002 | Engineering Physics/ | 3 | 0 | 0 | 3 | 30 | 70 |
| | | 21BBSBS10003 | Engineering Chemistry | | | | | | |
| 3 | ES | 21BBSES10001 | Basic Electrical and Electronics Engineering / | 3 | 0 | 0 | 3 | 30 | 70 |
| | | 21BBSES10002 | Elements of Mechanical Engineering | 3 | 1 | 0 | 4 | | |
| 4 | ES | 21BBSES11003 | Programming for Problem Solving | 2 | 0 | 0 | 2 | 30 | 70 |
| 5 | HS | 21BBSHS11001 | Communicative English and Soft Skills | 2 | 0 | 0 | 2 | 30 | 70 |
| 6 | HMS | 21BBSHS10002 | HV&PE/ | 2 | 0 | 0 | 2 | 30 | 70 |
| | ES | 21BBSES10004 | Dietetics & Nutrition | 2 | 0 | 0 | 2 | 30 | 70 |
| PRACTICAL / SESSIONAL | | | | | | | | | |
| 1 | BS | 21BBSBS10102 | Engineering Physics Laboratory | 0 | 0 | 2 | 1 | 35 | 15 |
| | | 21BBSBS10103 | Engineering Chemistry Laboratory | | | | | | |
| 2 | ES | 21BBSES10101 | Basic Electrical and Electronics Engineering Laboratory (For BEE) | 0 | 0 | 2 | 1 | 35 | 15 |
| 3 | ES | 21BBSES11103 | Programming for Problem Solving Laboratory | 0 | 0 | 4 | 2 | 70 | 30 |
| 4 | HS | 21BBSHS11101 | Communicative English and Soft Skills Laboratory | 0 | 0 | 2 | 1 | 35 | 15 |
| 5 | ES | 21BBSES10105 | Engineering Graphics & Design | 1 | 0 | 2 | 2 | 70 | 30 |
| | | 21BBSES10106 | Engineering Workshop | | | | | | |
| 6 | MC | 21BBSMC11101 | Induction Program(3 weeks) | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL CREDIT | | | | | | | 23 | | |

SYLLABUS STRUCTURE 2ND SEMESTER (2021-25)

| Sl. No. | Course Category | Course Code | Course Title | Hours per week | | | Credits | CIA | ESE |
|------------------------------|-----------------|--------------|--|----------------|---|---|-----------|-----|-----|
| | | | | L | T | P | | | |
| | | | THEORY | | | | | | |
| 1 | BS | 21BBSBS12001 | Engineering Mathematics-II | 3 | 1 | 0 | 4 | 30 | 70 |
| 2 | BS | 21BBSBS10002 | Engineering Physics/ | 3 | 0 | 0 | 3 | 30 | 70 |
| | | 21BBSBS10003 | Engineering Chemistry | | | | | | |
| 3 | ES | 21BBSES10001 | Basic Electrical and Electronics Engineering / | 3 | 0 | 0 | 3 | 30 | 70 |
| | | 21BBSES10002 | Elements of Mechanical Engineering | 3 | 1 | 0 | 4 | | |
| 4 | ES | 21BBSES12003 | Data Structure & Algorithms | 2 | 0 | 0 | 2 | 30 | 70 |
| 5 | HS | 21BBSHS12001 | Communicative English & Technical Communication | 2 | 0 | 0 | 2 | 30 | 70 |
| 6 | HMS/ | 21BBSHS10002 | HV&PE/ | | | | | | |
| | ES | 21BBSES10004 | Dietetics & Nutrition | 2 | 0 | 0 | 2 | 30 | 70 |
| PRACTICAL / SESSIONAL | | | | | | | | | |
| 1 | BS | 21BBSBS10102 | Engineering Physics Laboratory | 0 | 0 | 2 | 1 | 35 | 15 |
| | | 21BBSBS10103 | Engineering Chemistry Laboratory | | | | | | |
| 2 | ES | 21BBSES10101 | Basic Electrical and Electronics Engineering Laboratory | 0 | 0 | 2 | 1 | 35 | 15 |
| 3 | ES | 21BBSES12103 | Data Structure & Algorithms Laboratory | 0 | 0 | 4 | 2 | 70 | 30 |
| 4 | HS | 21BBSHS12101 | Communicative English and Technical Communication Laboratory | 0 | 0 | 2 | 1 | 35 | 15 |
| 5 | ES | 21BBSES10105 | Engineering Graphics & Design | 1 | 0 | 2 | 2 | 70 | 30 |
| | | 21BBSES10106 | Engineering Workshop | | | | | | |
| 6 | MC | 21BBSMC12101 | NSS/YOGA | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL CREDIT | | | | | | | 23 | | |

| | | | | | | | | | | | | | | | |
|---|--|---|---|---|---|---|---|---|---|----|----|-------------------|------|---|---|
| Subject Code | Title of the subject | | | | | | | | | | L | T | P | C | |
| 21BBSBS11001 | Engineering Mathematics-I | | | | | | | | | | 3 | 1 | 0 | 4 | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1 | To find critical points, and use them to locate maxima and minima. | | | | | | | | | | | | | | |
| CEO2 | To provide the standard methods for solving differential equations. | | | | | | | | | | | | | | |
| CEO3 | To study Fourier series and to express a function in Fourier series. | | | | | | | | | | | | | | |
| CEO4 | To use matrices, determinants and techniques for solving systems of linear equations in the different areas of Linear Algebra. | | | | | | | | | | | | | | |
| Course Outcomes: Towards the end of the course students will be able to : | | | | | | | | | | | | | | | |
| CO1 | Implement the engineering problems using the concept of Partial differentiation and series and to understand its application. | | | | | | | | | | | | | | |
| CO2 | Solve the initial value and boundary value problem of ODE related to Electrical circuit. | | | | | | | | | | | | | | |
| CO3 | Execute the technique of Fourier series for applying in Engineering applications. | | | | | | | | | | | | | | |
| CO4 | Find the Eigen value and vector of a matrix by using properties of linear algebra | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 1 | 2 | | | | | | | | | | | | | |
| CO2 | 2 | 3 | | | | | | | | | | | | | |
| CO3 | 1 | 3 | | | | | | | | | | | | | |
| CO4 | 2 | 3 | | | | | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| UNIT-I | | | | | | | | | | | | (10 Hours) | | | |
| MULTI-VARIABLE CALCULUS | | | | | | | | | | | | | | | |
| Limit and Continuity, Partial differentiation, Euler's theorem, Total derivative, Taylor's theorem for function of two variable (without proof), Maxima and Minima for function of two variables, Differentiation under integral sign (Leibnitz rule). | | | | | | | | | | | | | | | |
| UNIT- II | | | | | | | | | | | | (12 Hours) | | | |
| DIFFERENTIAL EQUATIONS-I | | | | | | | | | | | | | | | |
| Ordinary differential Equations: First order and first degree differential equations and their method of solving, Application to Electrical circuits and heat conduction. DIFFERENTIAL EQUATIONS-II | | | | | | | | | | | | | | | |
| Linear differential equations of higher order and their different methods of solutions (operator methods). Second order linear differential equations and their solutions: Euler Cauchy equation, solution by undermined coefficient method and variation of parameters. Simple application to electrical circuits. | | | | | | | | | | | | | | | |

UNIT -III**(8 Hours)**

Fourier series, Fourier expansion of functions of arbitrary period, Even and odd functions, Half Range Expansion.

UNIT -IV**(10 Hours)****LINEAR ALGEBRA:**

Matrices, Types of matrices, Rank of matrix, Eigen values and Eigen vectors, Cayley – Hamilton theorem (without proof), system of linear equations, Orthogonal matrices, Complex matrices, Hermitian and skew-Hermitian matrices, Unitary matrices, similarity of matrices. Quadratic forms and Canonical forms.

Prescribed Books:

1. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition, Willey
2. Differential Calculus by Santi Narayan and P.K .Mittal, S.Chand Publications

References:-

1. Higher Engineering Mathematics by BS Grewal : Khanna Publishers, New Delhi.
2. Higher Engineering Mathematics by B.V.Ramana, McGraw Hills Education
3. Advanced Engineer methods by N. P. Bali & Manish Goyal
4. Differential Calculus by J. Sinha Roy & S. Padhi.
5. Differential Calculus” by Vinay Kumar, 3rd Edition 2021, Mc Graw Hill,

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| Subject Code | Title of the subject | | | | | | | | | | | L | T | P | C | |
| 21BBSBS110B1 | Engineering Mathematics-I (ONLY FOR BIOTECH) | | | | | | | | | | | 3 | 1 | 0 | 4 | |
| Course Educational Objectives | | | | | | | | | | | | | | | | |
| CEO1 | Concept about the sets, tautology, contra positive and truth table. | | | | | | | | | | | | | | | |
| CEO2 | To use matrices, determinants and techniques for solving system of linear equations in Linear Algebra. | | | | | | | | | | | | | | | |
| CEO3 | To Provide the standard methods for differentiation. | | | | | | | | | | | | | | | |
| CEO4 | To Provide the standard methods for integration. | | | | | | | | | | | | | | | |
| Course Outcomes: Towards the end of the course students will be able to : | | | | | | | | | | | | | | | | |
| CO1 | Understand the concept about logic, set theory and proof by method of induction. | | | | | | | | | | | | | | | |
| CO2 | Find the Inverse and solution of liner equations by using matrix methods. | | | | | | | | | | | | | | | |
| CO3 | Evaluate the differentiation of standard functions and it's application. | | | | | | | | | | | | | | | |
| CO4 | Evaluate the integration of standard functions and it's application. | | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | 1 | 2 | | | | | | | | | | | | | | |
| CO2 | 2 | 3 | | | | | | | | | | | | | | |
| CO3 | 1 | 3 | | | | | | | | | | | | | | |
| CO4 | 2 | 3 | | | | | | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | | |
| UNIT-I | | | | | | | | | | | | | | (10 Hours) | | |
| LOGIC AND SET THEORY: | | | | | | | | | | | | | | | | |
| Introduction , statement, Negation, Conjunction, Disjunction, Conditional, converse , bi-conditional, Inverse, Contra positive , Truth table, Tautology ,Methods of proof, sets, sub set and power set, Van Diagrams and Cartesian product of sets. | | | | | | | | | | | | | | | | |
| UNIT-II | | | | | | | | | | | | | | (12 Hours) | | |
| LINEAR ALGEBRA: | | | | | | | | | | | | | | | | |
| Definition of Matrices, Addition, Subtraction, Multiplication Matrices, Types of matrices, Rank of matrix, Determinants of a matrices, Minors and Cofactors, Inverse of matrix, Transpose of Matrix and Properties, system of linear equations Cramer's rule, symmetric and skew symmetric matrices ,Orthogonal matrix. | | | | | | | | | | | | | | | | |

UNIT-III**(10 Hours)****DIFFERENTIAL CALCULUS:**

Definition of function, limit and continuity, Simple problems on limit, Simple problems on continuity, Differentiation of x^n , e^x , $\sin x$ & $\cos x$ from first principle, Derivatives of sum, difference, product and quotient of two functions, Differentiation of functions of functions (Simple problem based on it), Logarithmic differentiation (Simple problem based on it), Differentiation by substitution method on it,

UNIT- IV**INTEGRAL CALCULUS :****(10 Hours)**

Integration of simple functions, Integration of Product of two functions, Integration by substitution method, Integration by substitution method, Definite Integral (simple problems based on it), Integration by parts, Integration by partial fraction, Area under simple well-known curves (simple problems based on it).

Prescribed Books:

1. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition, Willey
2. Differential Calculus by Santi Narayan and Mittal, S.Chand Publications

Reference:-

1. Higher Engineering Mathematics by BS Grewal : Khanna Publishers, New Delhi.
2. Higher Engineering Mathematics by B.V.Ramana, McGraw Hills Education
3. Advanced Engineer methods by N. P. Bali & Manish Goyal.
4. Elements Of Mathematics

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|---|---|---|---|---|---|---|---|---|---|----|----------|-------------------|----------|----------|---|
| Subject Code | Title of the subject | | | | | | | | | | L | T | P | C | |
| 21BBSBS12001 | Engineering Mathematics-II | | | | | | | | | | 3 | 1 | 0 | 4 | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1 | To focus on partial derivative and its methods. | | | | | | | | | | | | | | |
| CEO2 | To make them understand about laplace and fourier transform. | | | | | | | | | | | | | | |
| CEO3 | To calculate the gradients and directional derivatives of functions of several variables | | | | | | | | | | | | | | |
| CEO4 | To introduce the concept of Vector differentiation and integration that finds applications in various fields like solid mechanics, fluid flow, heat problems and potential theory | | | | | | | | | | | | | | |
| Course Outcomes: Towards the end of the course the students will be able | | | | | | | | | | | | | | | |
| CO1 | To know how to solve the partial differential equation by suitable method. | | | | | | | | | | | | | | |
| CO2 | I. To Solve Ordinary differential and integral equation by using Laplace transform, II. Execute the technique of Fourier Integral and transform for learning in advanced Engineering Mathematics. | | | | | | | | | | | | | | |
| CO3 | To relate gradient, curl and divergence and its application in fluid dynamics. | | | | | | | | | | | | | | |
| CO4 | To evaluate multiple integrals by using Green's, Stokes' and divergence theorem to give physical interpretation of the curl and divergence of a vector field . | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 3 | 2 | | | | | | | | | | | | | |
| CO2 | 2 | 3 | | | | | | | | | | | | | |
| CO3 | 1 | 3 | | | | | | | | | | | | | |
| CO4 | 2 | 3 | | | | | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| UNIT - I | | | | | | | | | | | | (08 Hours) | | | |
| INTRODUCTION OF PARTIAL DIFFERENTIAL EQUATIONS: | | | | | | | | | | | | | | | |
| Formation of Partial differential equations, linear partial differential equation of first order: Lagrange's linear differential equation, Non-Linear partial differential equation of first order by Charpit's method. | | | | | | | | | | | | | | | |
| UNIT-II | | | | | | | | | | | | (12 Hours) | | | |
| LAPLACE TRANSFORMS: | | | | | | | | | | | | | | | |
| Definition, existence of Laplace Transforms, Properties of Laplace Transforms, Evaluation of integrals by Laplace Transforms, Inverse transforms, convolution theorem, transforms of unit step function, unit impulse function, and periodic function. Solution of ordinary differential equations by Laplace Transform, Definition of Fourier Integral and Fourier transform | | | | | | | | | | | | | | | |
| UNIT - III | | | | | | | | | | | | (8 Hours) | | | |
| VECTOR DIFFERENTIAL CALCULUS: | | | | | | | | | | | | | | | |
| vector and scalar functions and fields, Derivatives, Curves, tangents and arc Length, gradient, divergence, curl and their simple application. | | | | | | | | | | | | | | | |

UNIT - IV**(12 Hours)****VECTOR INTEGRAL CALCULUS:**

Definition and evaluation of double integration and triple integration, Evaluation of line integral, Surface integral and volume integral and their applications, Transformations theorems- Green's Theorem in plane , Stoke's Theorem, Gauss Divergence Theorem and their applications.

Prescribed Books

1. Advanced Engineering Mathematics by E. Kreyszig, John Willey & Sons Inc. 10th Edition

References:

1. Higher Engineering Mathematics by B. V. Ramana , Mc Graw Hill Education.
2. Higher Engineering Mathematics by BS Grewal : Khanna Publishers, New Delhi.
3. Advanced Engineering mathematics by H. K. Dass.
4. Differential Calculus by J. Sinha Roy & S. Padhi.

| Subject Code | Title of the subject | L | T | P | C | | | | | | | | | | | |
|---|--|---|---|---|---|-------------------|---|---|---|----|----|----|------|---|---|--|
| 21BBSBS120B1 | Engineering Mathematics-II (ONLY FOR BIOTECH) | 3 | 1 | 0 | 4 | | | | | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | | |
| CEO1 | To focus on coordinate system | | | | | | | | | | | | | | | |
| CEO2 | To study vector function and scalar function in vectors. | | | | | | | | | | | | | | | |
| CEO3 | To provide the standard methods for solving algebraic equations. | | | | | | | | | | | | | | | |
| CEO4 | To study the probability and it's properties. | | | | | | | | | | | | | | | |
| Course Outcomes: Towards the end of the course the students will be able to | | | | | | | | | | | | | | | | |
| CO1 | Understand the concept of straight-line and circle and application. | | | | | | | | | | | | | | | |
| CO2 | Find the gradient, divergence, curl and their simple application. | | | | | | | | | | | | | | | |
| CO3 | Solve the algebraic equations by using different methods and also understand the concept of interpolation. | | | | | | | | | | | | | | | |
| CO4 | Understand the concept of conditional probability and testing of hypothesis. | | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | 3 | 2 | | | | | | | | | | | | | | |
| CO2 | 2 | 3 | | | | | | | | | | | | | | |
| CO3 | 1 | 3 | | | | | | | | | | | | | | |
| CO4 | 2 | 3 | | | | | | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | | |
| UNIT – I | | | | | | (10 Hours) | | | | | | | | | | |
| CO-ODINATE GEOMETRY | | | | | | | | | | | | | | | | |
| <p>Straight Lines: Introduction, Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, point-slope form, slope-intercept form, two point form, intercepts form and normal form. General equation of a line.</p> <p>Circles : circle, Equation of circle whose centre and radius is known, General equation of a circle, equation of tangent and normal Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points (x_1, y_1) & (x_2, y_2),</p> | | | | | | | | | | | | | | | | |
| UNIT - II | | | | | | (8 Hours) | | | | | | | | | | |
| VECTORS | | | | | | | | | | | | | | | | |
| <p>vectors and scalars, Types of Vectors, Algebra of vectors, Position Vectors, Scalar product , vector product, unit vectors, Scalar triple product and vector triple product, vector functions ,Derivatives, Curves, tangents and arc Length, gradient, divergence, curl and their simple application.</p> | | | | | | | | | | | | | | | | |
| UNIT -III | | | | | | (10 Hours) | | | | | | | | | | |
| NUMERICAL METHODS : | | | | | | | | | | | | | | | | |
| <p>Errors, Solving of algebraic and transcendental equations by using bisection method, fixed point iteration and Newton-Raphson's method. Finite Differences, Newton's forward and backward interpolation formula (without proof), Newton divided difference interpolation, Lagrange interpolation.</p> | | | | | | | | | | | | | | | | |

UNIT-1V**(12 Hours)****PROBABILITY AND STATISTICS**

Events, Sample space , definition of probability, Axioms of probability, Addition theorem of probability with examples, Multiplication theorem of probability with illustrate examples. Conditional probability, Bay's theorem with examples.

Mean, Median, Mode, Testing of hypothesis (chi-square test), Regression and correlation analysis, fitting of straight line by least square method.

Prescribed Books:

1. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition, Willey
2. Differential Calculus by Santi Narayan and Mittal, S.Chand Publications

Reference:-

1. Higher Engineering Mathematics by BS Grewal : Khanna Publishers, New Delhi.
2. Higher Engineering Mathematics by B. V. Ramana, McGraw Hills Education
3. Advanced Engineer methods by N. P. Bali & Manish Goyal.
4. Elements Of Mathematics

| Subject Code | Name of the Subject | L | T | P | C | | | | | | | | | | |
|---|---|----------|----------|----------|----------|---|---|---|---|----|----|----|------|---|---|
| 21BBSHS11001 | Communicative English and Soft Skills | 2 | 0 | 0 | 2 | | | | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1 | To promote communication skills and soft skills. | | | | | | | | | | | | | | |
| CEO2 | To enhance the employability and entrepreneurial skills | | | | | | | | | | | | | | |
| CEO3 | To motivate the students to participate in group discussions without stage fear | | | | | | | | | | | | | | |
| Course Outcomes: Towards the end of the course, the students will be able to: | | | | | | | | | | | | | | | |
| CO1 | Understand the importance of effective communication for professional development | | | | | | | | | | | | | | |
| CO2 | Application of vocabulary and grammar for effective communication. | | | | | | | | | | | | | | |
| CO3 | Application of Information and Communication Technology(ICT) for career development | | | | | | | | | | | | | | |
| CO4 | Nurture and motivate positive attitude towards placements. | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | | | | | | | | | | 3 | | | | | |
| CO2 | | | | | | | | | | 3 | | | | | |
| CO3 | | | | | | | | | | 3 | | | | | |
| CO4 | | | | | | | | | | 3 | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| UNIT -1 Importance of English for Communication in the 21st Century (9 hours) | | | | | | | | | | | | | | | |
| 1.1 Role of English in enhancing employability and entrepreneurial skills (1) | | | | | | | | | | | | | | | |
| 1.2 The Nature and Scope of Communication (1) | | | | | | | | | | | | | | | |
| 1. 3 English Language skills, i.e., LSRW skills ; appropriate use of skills in communicative contexts (1+1+1) | | | | | | | | | | | | | | | |
| 1.4 The process of communication and factors that influence communication: Sender, receiver, channel, code, topic, message, context, feedback, noise, filters and barriers (steps such as Ideation, Encoding, Transmission, Decoding, etc. need to be dealt with); Audience and purpose (1 + 1) | | | | | | | | | | | | | | | |
| 1.5 Types of Communication: General and Professional Communication; Written communication and Spoken communication. (1 + 1) | | | | | | | | | | | | | | | |
| UNIT -2. English Vocabulary, Grammar & Usage (8 hours) | | | | | | | | | | | | | | | |
| 2.1 Synonyms and Antonyms 1 | | | | | | | | | | | | | | | |
| 2.2 Words often confused 1 | | | | | | | | | | | | | | | |
| 2.3 Technical terms and one word substitutes 1 | | | | | | | | | | | | | | | |
| 2.4 Sentence Structure and syntax 1 | | | | | | | | | | | | | | | |
| 2.5 Common errors in English. 1+1 | | | | | | | | | | | | | | | |
| 2.6 Communicative use of the Passive Voice 1 | | | | | | | | | | | | | | | |
| 2.7 Difference between American, British and Indian English (Vocabulary based) 1 | | | | | | | | | | | | | | | |
| UNIT- 3. Introduction to Corporate Communication (11 hours) | | | | | | | | | | | | | | | |
| 3.1 Seven C's communication and Ten C's of Non-communication. 1 | | | | | | | | | | | | | | | |
| 3.2. Intercultural and cross cultural communication. 1 | | | | | | | | | | | | | | | |
| 3.3 Corporate Communication – Direction of Communication: Downward Communication, Upward Communication, Horizontal/Lateral Communication, Diagonal Communication 1 + 1 | | | | | | | | | | | | | | | |
| 3.4 Communication challenges in today's work place: Advances in technology; culturally diverse workforce; Team-based organizational Settings; how to overcome these challenges 1 + 1 | | | | | | | | | | | | | | | |
| 3.5 Information and Communication Technology (ICT) and the corporate world, Power point presentation using multimedia; Internet and Intranet. 1+1 | | | | | | | | | | | | | | | |
| 3.6 Corporate/Business etiquette: Mobile etiquette, proper handshake, body language, social etiquette. 1 + 1 | | | | | | | | | | | | | | | |
| 3.7 How to handle difficult conversations at work 1 | | | | | | | | | | | | | | | |

UNIT- 4 Soft skills Development.**(8 hrs)**

- 4.1 Importance of soft skills in personal and professional life 1+1
- 4.2 Time and stress management. 1+1
- 4.3 Leadership, team work and net-working skills 1+1
- 4.4. Lateral thinking and problem solving skills; Emotional Intelligence 1+1

Teaching Methods: Chalk& Board/ PPT/Video Lectures

Text Books:

1. An Introduction to Professional English and Soft Skills by B. K. Das et al., Cambridge University Press.
2. Communicative English for Engineers and Professionals by Nitin Bhatnagar and Mamta Bhatnagar. Published by DK/Pearson.
3. Practical English Usage. Michael Swan, OUP, 1995

Reference Books:

1. Technical Communication , Principle and Practice by Meenakshi Raman & Sangeeta Sharma, Oxford University Press
2. Business Communication Today by Bovee, Courtland L., Thill, John V. Prentice Hall.
3. The Ace of Soft Skills: Attitude, Communication and Etiquette for Success by Gopalaswamy Ramesh and Mahadevan Ramesh. Pearson.
4. Oxford Guide to English Grammar by John Easthood. Oxford University Press.
5. 365 Ways to Change Your World by Norman Vincent Peale by Orient Paperbacks.
6. Soft Skills For Your Career by Kalyani Samantray Oxford University Press, 2016.

| Lab Code | Name of the Lab | L | T | P | C | | | | | | | | | | |
|---|--|----------|----------|----------|----------|---|---|---|---|----|----|----|------|---|---|
| 21BBSHS11101 | Communicative English and Soft Skills Laboratory | 0 | 0 | 2 | 1 | | | | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1 | To develop the communication skills of the students, especially the Listening and Speaking skills. | | | | | | | | | | | | | | |
| CEO2 | To develop the vocabulary and usage skills of students by practice. | | | | | | | | | | | | | | |
| CEO3 | To enable students to participate in group discussions through proper listening and speaking. | | | | | | | | | | | | | | |
| CEO4 | To enable students eliminate grammatical mistakes in speech and writing. | | | | | | | | | | | | | | |
| Course Outcomes: The students will be able to: | | | | | | | | | | | | | | | |
| CO1 | Build up a good range of vocabulary and know proper usage. | | | | | | | | | | | | | | |
| CO2 | Become active listeners with good comprehension, participation, and evaluation. | | | | | | | | | | | | | | |
| CO3 | Develop conversational and public speaking competencies. | | | | | | | | | | | | | | |
| CO4 | Use grammar for effective speaking in GD and other formats of speaking. | | | | | | | | | | | | | | |
| CO5 | Eliminate stage fear and hesitancy in speaking. | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| COs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | | | | | | | | | | 3 | | | | | |
| CO2 | | | | | | | | | | 2 | | | | | |
| CO3 | | | | | | | | | | 3 | | | | | |
| CO4 | | | | | | | | | | 3 | | | | | |
| CO5 | | | | | | | | | | 2 | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| Phonetics & Listening Skills 10 hours = 5 classes [2 listening tests x 10 marks=20 marks] | | | | | | | | | | | | | | | |
| Vowels, diphthongs, consonants, consonant clusters; The International Phonetic Alphabet (IPA); phonemic transcription; Problem sounds; Syllable division and word stress; Sentence rhythm and weak forms; Contrastive stress in sentences to highlight different words; Intonation: falling, rising, and falling-rising tunes; Listening to Newspaper reading/Video, etc. | | | | | | | | | | | | | | | |
| Listening with a focus on pronunciation (ear-training): segmental sounds, stress, weak forms, intonation & Listening for comprehension. | | | | | | | | | | | | | | | |
| Reading comprehension skills: Identifying main ideas and details; analyzing text structure; inferencing underlying ideas/meanings: speculating what may happen next in the reading text; integrating reading to listening and speaking activities. | | | | | | | | | | | | | | | |
| Speaking skills 10 hours = 5 classes [4 speaking tests x 10 = 40 marks] | | | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> • Topics for 1 minute, 2 minutes, and 5 minutes speaking; Pictures , Quotations , Attitude-testing Questions may be used. • Responding to handouts, articles, books magazines and newspapers. • Summarizing a reading text. | | | | | | | | | | | | | | | |
| Individual/Group presentations discussion on given topics | | | | | | | | | | | | | | | |
| Soft skills development 10 hours = 5 classes [4 assignments x 10 = 40 marks] | | | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> • Basic Writing skills 1+1+1 • Time & stress management 1+1 • Lateral thinking & problem solving 1+1 • Practice with GD techniques 1+1+1 | | | | | | | | | | | | | | | |
| Teaching Methods: Chalk& Board/ PPT/Video Lectures | | | | | | | | | | | | | | | |
| Text/Reference Books: | | | | | | | | | | | | | | | |
| 1. <i>Form and Finesse, Business Communication and Soft skills</i> by Shruti Das, Published by Orient Black Swan. | | | | | | | | | | | | | | | |
| 2. <i>Business and Corporate Soft skills</i> developed by Rai Tech. University (PDF available) | | | | | | | | | | | | | | | |
| 3. <i>Spoken English (with CD)</i> . Sasikummar V and P V Dhamija. New Delhi: Tata McGraw-Hill Education Pvt. Ltd. (2 nd Ed.) | | | | | | | | | | | | | | | |

| | | | | | | |
|--------------|--|---|---|---|---|--|
| Subject Code | Title of the subject | L | T | P | C | |
| 21BBSHS12001 | Communicative English and Technical Communication | 2 | 0 | 0 | 2 | |

Course Educational Objectives

| | |
|------|--|
| CEO1 | To develop the communication skills and soft skills of the students |
| CEO2 | To enhance the ability of the students to develop employability and entrepreneurial skills |
| CEO3 | To enable students to successfully participate in GDs and PIs |
| CEO4 | To make students communicate effectively using technologies and techniques |
| CEO5 | To inculcate a sense of professionalism in students |

Course Outcomes: *The students will be able to:*

| | |
|-----|--|
| CO1 | Understand the importance of technology in communication |
| CO2 | Develop career conscious leading to preparation for career. |
| CO3 | Understand the nature and scope of corporate communication and try to be industry-ready. |
| CO4 | Prepare professional documents for career needs (e.g. Job application letter, résumé) and professional needs (e.g., Memo and E-mail writing) |

CO-PO & PSO Mapping

| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
|-----|--------------------|---|---|---|---|---|---|---|---|----|----|----|------|---|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | | | | | | | | | | 3 | | | | | | |
| CO2 | | | | | | | | | | 3 | | | | | | |
| CO3 | | | | | | | | | | 3 | | | | | | |
| CO4 | | | | | | | | | | 3 | | | | | | |

SYLLABUS

UNIT 1 Introduction to Technical Communication **7 hours**

1.1 Essence of Technical Communication 1
1.2 Nature and Scope of Technical Communication: 1 +1 +1
Technical Communication -- Interactive and Adaptable; Technical Communication -- Reader Centered; Technical Communication and teamwork; Technical Communication Has Ethical, Legal, and Political Dimensions; Technical Communication – its International and Cross-Cultural nature.
1.3 Need of Technical communication for career development 1
1.4 Computer Assisted Language Learning (CALL) – Self learning through use of technology, Effectiveness of CALL for developing English Language Skills; Use of Internet 1 +1

UNIT 2 Workplace Communication **15 hours**

2.1. Career making: Setting Goals, SWOT analysis 1
2.2 Preparing a Résumé: Elements of a Résumé; Types of Résumés: Chronological Résumé, Functional Résumé; Use of job portals 1 +1 +1
2.3 Effective Job Application Letter/Cover letter 1 +1
2.4 Group Discussion 1+1+1
2.5 Job Interview 1+1
2.6 Effective Oral Presentation 1+1
2.7 Handling a Meeting 1+1

UNIT 3 Technical Approach to Reading**6 Hours**

- 3.1 Know your Reading speed; Advantages of speed reading 1
- 3.2 SQ4R Techniques of Reading 1+1
- 3.3. Techniques of Rapid reading: skimming, scanning, inferencing 1+1
- 3.4 Understanding coherence and cohesion 1

UNIT 4 Technical Writing**10 hours**

- 4.1 Writing a technical paper 1+1
- 4.2 Writing business letters – significance, purpose, structure and elements, layout; types of business letters 1+1
- 4.3 Email Etiquette 1
- 4.4 Business Reports and Technical proposals 1+1+1
- 4.5 Using the Social media for better communication 1+1

Teaching Methods: Chalk& Board/ PPT/Video Lectures

Text Books:

- 1. Form and Finesse, Business Communication and Soft skills by Shruti Das, Published by Orient Black Swan.
- 2. Business Communication Today by Bovee, Courtland L., Thill, John V. Prentice Hall.
- 3. Technical Communication Today by Richard Johnson-Sheehan. Edition 5. Pearson.
- 4. Communicative English for Engineers and Professionals by Nitin Bhatnagar and Mamta Bhatnagar. Published by DK/Pearson.

Reference Books:

- 1. Basic Communication Skills for Technology by Andre J. Rutherford, Pearson Education Asia, Patparganj, New Delhi.
- 2. Business Communication by Varinder Kumar and Bodh Raj. Kalyani Publishers.
- 3. A Textbook of English Phonetics for Indian Students by T. Balasubramanian
- 4. Technical Communication , Principle and Practice by Meenakshi Raman &Sangeeta Sharma, Oxford University Press
- 5. How to Read better and Faster by Norman Lewis. 4th Edition. Publisher: Crowell.
- 6. Soft Skills For Your Career by Kalyani Samantray OXFORD UNIVERSITY PRESS, 2016

| | | | | | | |
|--------------|--|---|---|---|---|--|
| Subject Code | Name of the Subject | L | T | P | C | |
| 21BBSHS12101 | Communicative English and Technical Communication Laboratory | 0 | 0 | 2 | 1 | |

Course Educational Objectives

| | |
|------|---|
| CEO1 | To enable students to successfully participate in GDs and PIs. |
| CEO2 | To make students communicate effectively by classroom practice. |
| CEO3 | To inculcate a sense of professionalism in students |

Course Outcomes: The students will be able to:

| | |
|-----|--|
| CO1 | Prepare professional documents for career needs (e.g. Job application letter, résumé) and professional needs (e.g., Memo and E-mail writing) |
| CO2 | Effectively participate in GD and PI. |
| CO3 | Emerge as an effective presenter/public speaker |
| CO4 | Understand the practical needs at workplace (e.g., organize a meeting) |

CO-PO & PSO Mapping

| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
|-----|--------------------|---|---|---|---|---|---|---|---|----|----|----|------|---|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | | | | | | | | | | 3 | | | | | | |
| CO2 | | | | | | | | | | 3 | | | | | | |
| CO3 | | | | | | | | | | 2 | | | | | | |
| CO4 | | | | | | | | | | 3 | | | | | | |

SYLLABUS

| | |
|---|---------|
| 1. Writing an Effective Job Application Letter/Cover letter | 4 hours |
| 2. Writing a winning resume and posting in job portals | 4 hours |
| 3. Group Discussion, case studies and problem statement | 4 hours |
| 4. Job Interview, versant test, video resumes | 4 hours |
| 5. Oral presentation | 4 hours |
| 6. Organizing a Meeting | 4 hours |
| 7. Practice Vocabulary Exercises | 4 hours |
| 8. Pictorial Demonstration | 2 hours |
| 9. Profiling a company | 4 hours |
| 10. Summarizing books/research paper/news report | 2 hours |

Text Books:

1. Form and Finesse, Business Communication and Soft skills by Shruti Das, Published by Orient Black Swan.
2. Business Communication Today by Bovee, Courtland L., Thill, John V. Prentice Hall.
3. Technical Communication Today by Richard Johnson-Sheehan. Edition 5. Pearson.
4. Communicative English for Engineers and Professionals by Nitin Bhatnagar and Mamta Bhatnagar. Published by DK/Pearson.

Reference Books:

1. Basic Communication Skills for Technology by Andre J. Rutherford, Pearson Education Asia, Patparganj, New Delhi.
2. Business Communication by Varinder Kumar and Bodh Raj. Kalyani Publishers.
3. A Textbook of English Phonetics for Indian Students by T. Balasubramanian
4. Technical Communication , Principle and Practice by Meenakshi Raman & Sangeeta Sharma, Oxford University Press
5. How to Read better and Faster by Norman Lewis. 4th Edition. Publisher: Crowell.
6. Soft Skills For Your Career by Kalyani Samantray OXFORD UNIVERSITY PRESS, 2016

| | | | | | |
|---------------------|--|----------|----------|----------|----------|
| Course Code | Course Title | L | T | P | C |
| 21BBSES11003 | Programming for Problem Solving | 2 | 0 | 0 | 2 |

Pre -Requisite: computer basics.

Course Educational Objective

CEO1: To formulate algorithm, translate into program and then execute the programs for verifying its correctness.

CEO2: To analyze a problem for knowing its efficiency and decompose it into functions using divide and conquer approach.

Course Outcome: student can able to

| | |
|-----|--|
| CO1 | Formulate simple algorithms for arithmetic and logical problems and translate into programs. |
| CO2 | Understand and develop programs using loop, arrays and analyse its complexity. |
| CO3 | Understand and develop programs using strings, functions and recursions. |
| CO4 | Develop programs using pointers and structures, and understand their functionality. |

CO-PO MAPPING

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | 3 | 1 | | | | | | | | | |
| CO2 | 1 | 3 | 2 | | | | | | | | | |
| CO3 | 1 | 3 | 3 | | | | | | | | | |
| CO4 | 2 | 2 | 3 | | | | | | | | | |

UNIT- I

(10 Hours)

Programming: Introduction to Structured Programming Approach, Basic structure of C program, C compilers, Compilation and Execution Process, Error debugging.

C Tokens, keywords, identifiers, data types, constants, variables, standard I/O statements, Operators classifications, Operator precedence and associativity, Implicit and Explicit type casting.

Control Flow Statements: **Selection Logic:** if, if..else, else if ladder, nested if

UNIT- II

(10 Hours)

switch..case, **Iteration Logic:** while, do-while and for loop, break, continue, nested loop. **Arrays:** 1-D Array: declaration, initialization, array operations, 2-D Array: declaration, Initialization, 2-D array operations

UNIT- III

(10 Hours)

Character arrays and Strings: String handling operations, strcmp(), strcat(), strcpy(), strlen().

User Defined Functions: Function categories, Parameter passing in functions, Passing arrays to functions, Recursive functions, storage classes

UNIT- IV

(10 Hours)

User Defined Data Types: Structures: Declaration and initialization of structures, accessing structure elements, nested structures, structures and arrays, structures and functions, typedef **Pointers:** Declaration and initialization of pointers, Pointer arithmetic, Pointer and Arrays, call by value and call by address, Function returning pointer, pointer to structure, Dynamic memory allocation.

Text Books:

- 1) E. Balaguruswamy, Programming in ANSI C, 7th edition, Tata McGraw-Hill
- 2) Let us 'C' by Yashwant Kanethekar, 16th edition, BPB Publications
- 3) Byron Gottfried, Schaum's Outline of Programming with C, 3rd edition, McGraw-Hill.

References:

- 1) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd edition, Prentice Hall of India
- 2) Programming in C, by Reema Thareja, 2nd edition, OUP India
- 3) C Programming and Coding by swatisaxena, BPB Publications.

| | | | | | |
|---------------------|---|----------|----------|----------|----------|
| Course Code | Course Title | L | T | P | C |
| 21BBSES11103 | Programming for Problem Solving Laboratory | 0 | 0 | 4 | 2 |

Pre -Requisite:

Course Educational Objective

CEO1: To develop programs for problems on different applications of array, functions, Pointers and structure.

CEO2: To analyse different problems by comparing and implementing in programming.

Course Outcome

| | |
|-----|---|
| CO1 | To understand operating system and its simple commands, writing programs, compilation, debug and execution process. |
| CO2 | To develop programs using loop controls, arrays and understand the complexity using different programs. |
| CO3 | To develop programs using functions and recursive function by decomposing a problem and analyse them. |
| CO4 | To Solve numerical problems, develop different programs using pointers, structures and analyse their functionality. |

CO-PO MAPPING

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2 | 3 | 1 | | | | | | | | | |
| CO2 | 1 | 2 | 2 | 1 | | | | | | | | |
| CO3 | 1 | 2 | 2 | 1 | | | | | | | | |
| CO4 | 1 | 2 | 2 | 1 | | | | | | | | |

Lab Experiment 1: Familiarization with programming environment

- 1) Introduction to OS: Before starting experiments explain the facilities and operations of OS.
- 2) Introduction to the C compiler, Compilation and Execution Process & writing simple programs.

Lab Experiment 2: Simple computational problems using arithmetic expressions.

- 1) WAP to input radius of a circle and Find the area, perimeter of it.
- 2) WAP to input two numbers and swap them without using intermediate variable.

Lab Experiment 3: Simple computational problems using arithmetic expressions.

- 1) Write a program to accept Fahrenheit and calculate its equivalent Celsius.
- 2) WAP to input three unequal numbers and find the greatest using conditional operator.

Lab Experiment 4: Problems involving if, switch

- 1) Write a program to input a lower case alphabet and test whether it is vowel or consonant.(using else..if and switch both)
- 2) Write a program to find the greatest among three numbers.(using else..if and switch both)

Lab Experiment 5: while, do..while and for loops:

- 1) Write a program to find the Greatest Common Divisor of two integers using while statement.
- 2) Write a program to accept a positive integer and test it for Armstrong or not using do..while statement.

Lab Experiment 6: Nested Loop

- 1) Write a program to calculate the following sum using nested for statement: $Sum = 1 - (x^2)/2! + (x^4)/4! - (x^6)/6! + (x^8)/8! - (x^{10})/10!$
- 2) Write a program to generate the following pyramid using nested for statement:

```

1
1 2 1
1 2 3 2 1
1 2 3 4 3 2 1

```

Lab Experiment 7: 1D Array interaction

- 1) Write a program to accept 10 integers in to an array and find largest and smallest integers present in them.
- 2) Write a program to input 10 elements into an array. Then search for a given value in the array to know its existence.

Lab Experiment 8: 2D Array interaction

- 3) Write a program to input values into two matrices A(3x4), B(4x3). Perform matrix multiplication and display the resultant matrix.
- 4) Write a program to input two strings and test whether they are equal or not using string handling functions.

Lab Experiment 9: User Defined Functions

- 1) Write a C program which contains three UDF's namely add(), subtract() and multiply(). Each function accepts two integers as their arguments and calculate and return the results
- 2) Write a program to create an UDF and test a number is prime or not.

Lab Experiment 9: Recursive Functions

- 1) Write a program to accept 10 elements into an integer array. Find the largest element present using recursive function.
- 2) Write a program to generate Fibonacci series using a recursive function.

Lab Experiment 10: structures

- 1) Write a program to store 11 cricket players' details into an array of structure. The structure having member's player name, team name and batting average. Displays the name of players whose batting average is ≥ 30 .
- 2) Write a program to create a structure COMPLEX. Input two complex numbers using UDF and find the sum of them.

Lab Experiment 11: Pointers and Dynamic Memory Allocation

- 1) Write a program to create user defined function called swap having two integer pointers as its arguments and it has no return value. Call this function using call-by-address.
- 2) Write a program to store 'n' integers using dynamic memory allocation. Find the average value of the integers using a user defined function.

Lab Experiment 12: structure with pointer

- 1) Write a program create a structure PRODUCT having members Product no, Name and Price. Using a pointer Input 5 product details into a structure array and then display those products whose price is > 1000 rupees.
- 2) Write a program to create a structure EMPLOYEE to store N employee details i.e: employee no, name, salary. Display only those employee names whose salary ≥ 50000 .

Teaching Methods: Chalk & Board/ PPT/ Video Lecture

- A case study can be given to each student for each UNIT.
- A Mini Project can be given which the student have to do during the semester break.

Text Books:

- 4) E. Balaguruswamy, Programming in ANSI C, 7th edition, Tata McGraw-Hill
- 5) Let us 'C' by Yashwant Kanethkar, 16th edition, BPB Publications
- 6) Byron Gottfried, Schaum's Outline of Programming with C, 3rd edition, McGraw-Hill

References:

- 4) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd edition, Prentice Hall of India
- 5) Programming in C, by Reema Thareja, 2nd edition, OUP India
- 6) C Programming and Coding by swatisaxena, BPB Publications.

| | | | | | |
|-------------|--------------|---|---|---|---|
| Course Code | Course Title | L | T | P | C |
|-------------|--------------|---|---|---|---|

| | | | | | |
|---------------------|--------------------------------------|----------|----------|----------|----------|
| 21BBSES12003 | DATA STRUCTURE AND ALGORITHMS | 2 | 0 | 0 | 2 |
|---------------------|--------------------------------------|----------|----------|----------|----------|

Pre -Requisite: Basic knowledge of Algorithms

Course Educational Objective

CEO1: Develop algorithms for performing different operations on arrays, stack, Queue, linkedlist. Analyze the difference between them and understand different applications. Understand different searching and sorting methods and applications.

CEO2: Understand and analyze Binary search Tree, AVL Tree, Heap Tree and their applications. Understand the memory representation of graph, its traversal methods and applications. Analyze the Hashing techniques in compare with other sorting techniques.

Course Outcome: student can able to

| | |
|-----|---|
| CO1 | Develop algorithms for performing different operations on 1D array, matrix, stack, Queue, analyze the difference between them and understand different applications. |
| CO2 | Understand different searching and sorting methods, Linked lists and them compare them in terms of performance and applications. |
| CO3 | Understand the Binary Tree and its memory representation; analyze Binary search Tree and its applications, compare the BST with AVL Tree, Heap Tree and examine the advantages. |
| CO4 | Understand the memory representation of graph; analyze traversal methods and applications of graph. Analyze the Hashing techniques in compare with other sorting techniques. |

CO-PO Mapping:

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2 | 2 | 2 | | | | | | | | | |
| CO2 | 3 | 2 | 3 | | | | | | | | | |
| CO3 | 3 | 3 | 3 | | | | | | | | | |
| CO4 | 2 | 3 | 2 | | | | | | | | | |

UNIT- I

(11 Hours)

Basic concepts: Data abstraction, Data structures and types. Algorithm specification, 1D array: operations, 2D array: row major order and column major order
 Stack: Basic concepts, operations and implementation of stack using arrays, Mathematical procedure for conversions of arithmetic expressions. Applications of stack: infix to postfix conversion and postfix evaluation. Queue: Linear queue, operations and implementation using arrays, circular queue and its operations, Basics concepts of Double ended Queue and priority queue

UNIT- II

(11 Hours)

Searching: Linear search and Binary search on elements in a linear array. Sorting: Bubble sort, Insertion sort, Selection sort using linear array.
 Linked Lists: Basic concepts and operations of single linked list, linked stack, linked queue, circular single linked list, and Doublelinked list. Basic concept of Circular double linked list.

UNIT- III

(11 Hours)

Trees: Introduction, Terminology, Binary Trees, Memory Representation of Binary Trees using arrays and linked lists, Binary Tree traversal methods(recursive and non-recursive) , Construction of binary tree using in-order & pre-order sequences , in-order & post-order sequence. Expression Tree, Construction of expression tree using stack.
 Binary Search Trees: Algorithm for construction, searching and insertion operation, Introduction to Height Balanced trees, Balance factor, Balancing the BST by rotations during insertions of a node.

UNIT- IV**(11 Hours)**

Heaps: Introduction to binary heaps, definition of a Max-heap, Min-heap, creating Max-Heap Tree using insertion, Graphs: Terminologies, Memory Graph representation - Adjacency matrix, Incidence Matrix, Linked Representation, path matrix, Warshall's Algorithm to find path matrix, Graph Traversals (BFS & DFS), Topological Sorting

Hashing: Hashing Functions: Division, Mid-square, Folding methods. Collision, linear probing, chaining

Teaching Methods: Chalk& Board/ PPT

Text Books:

1. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.
2. Pai: "Data Structures & Algorithms; Concepts, Techniques & Algorithms "TataMcGraw Hill.
3. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomsonpublication

Reference Books:

1. "Fundamentals of data structure in C" Horowitz, Sahani& Freed, Computer SciencePress.
2. "Data Structures and algorithms" by Narasimha Karumanchi, CareerMonk Publications
3. "Data structures through C in depth" by S.K.Srivastava, BPB Publications

| | | | | | | |
|--------------|--|---|---|---|---|--|
| Subject Code | Name of the Subject | L | T | P | C | |
| 21BBSES12103 | DATA STRUCTURE AND ALGORITHMS LABORATORY | 0 | 0 | 4 | 2 | |

Course Outcomes: Upon successful completion of this course, students should be able to:

| | |
|-----|--|
| CO1 | Understand the concepts of algorithms and implement in developing the programs for different operations of 1D array |
| CO2 | Develop programs for performing different operations on matrix, analyze the them and understand their applications. |
| CO3 | Design code for stack and queue operations and analyze their performance. |
| CO4 | Develop the codes for different operations on linked list, implement concepts or stack and queue using linked list and compare them. |

CO-PO Mapping

| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
|-----|--------------------|---|---|---|---|---|---|---|---|----|----|----|------|---|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | 2 | 2 | 3 | | | | | | | | | | | | | |
| CO2 | 2 | 3 | 3 | | | | | | | | | | | | | |
| CO3 | 3 | 2 | 2 | | | | | | | | | | | | | |
| CO4 | 2 | 2 | 1 | | | | | | | | | | | | | |

SYLLABUS

Experiment-1(functions)

Q1) Write a program to create methods for performing addition, subtraction, multiplication and division on 2 integers.

Experiment 2: (concepts of array)

Q1)Write a C program to create methods for operations insertion, deletion, searching and display on 1D array of elements.

Experiment 3:(matrix)

Q1) Write a C program to create function for performing matrix multiplication.

Experiment-4: (pointer and DMA)

Q1) Write a program to store N numbers using dynamic memory allocation and then find the largest element using UDF.

Experiment 5:(structure and DMA)

Q1) Write a C program to create a structure called student to store your rollno, name, age. Create an array to input 5 students data and then create an UDF to display details where age>=20.

Experiment 6: (stack)

Q1) Write a program using C++ to create a stack and perform:
(i) push operation (ii) pop operation (iii) display operation

Experiment 7: (linear queue)

Q1) Write a C program to create a linear queue and perform the following operations: (i)insertion ii) deletion and iii) Traversal

Experiment 8: (circular queue)

Q1) Write a C program to create a circular queue and perform the following operations: (i)insertion ii) deletion and iii) Traversal

Experiment 9: (sorting)

Q1) write a program to implement bubble sort and selection sort on a list of array elements

Experiment 10: (sorting)

Q1) Write a program to implement linear and binary search on array elements using UDF

Experiment 11: (sorting)

Q1) write a program to implement insertion sort on a given list of array elements.

Experiment 12: (sorting)

Q1) Write a C program to implement quick sort to a given list of integers to sort in ascending order.

Experiment 13: (single linked list)

Q1) Write a C program that uses functions to perform the following operations on single linked list:

i) Insertion at beginning, ii) insertion at end, iii) insertion at node item, iv) Deletion of 1st node, v) deletion of last node, vi) deletion of a given node item, vii) search for a node item, iv) display all nodes

Experiment 14: (linked stack)

Q1) Write a C program that uses functions to implement linked stack on single linked list.

Experiment 15: (linked queue)

Q1) Write a C program that uses functions to implement linked queue on single linked list.

Text Books/ Reference Books:

1. Pai: "Data Structures & Algorithms; Concepts, Techniques & Algorithms" Tata McGraw Hill.
2. "Fundamentals of data structure in C" Horowitz, Sahani & Freed, Computer Science Press.
3. "Data structures through C in depth" by S. K. Srivastava, BPB Publications.

| | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|----|----|----|------|---|---|
| Subject Code | Title of the subject | | | | | | | | | | L | T | P | C | |
| 21BBSBS10002 | Engineering Physics | | | | | | | | | | 3 | 0 | 0 | 3 | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1 | Providing fundamental knowledge about the oscillations and waves | | | | | | | | | | | | | | |
| CEO2 | Providing knowledge of mathematical concepts to solve electromagnetic problems | | | | | | | | | | | | | | |
| CEO3 | To familiar with structure and different properties of materials. | | | | | | | | | | | | | | |
| CEO4 | To attain fundamental information about Quantum mechanics with applications. | | | | | | | | | | | | | | |
| Course Outcomes: Upon successful completion of this course, students should be able to: | | | | | | | | | | | | | | | |
| CO1 | Understand and analyze the concept of oscillation and wave mechanics. | | | | | | | | | | | | | | |
| CO2 | Interpret the fundamentals of electromagnetism and deduce the electromagnetic wave equations. | | | | | | | | | | | | | | |
| CO3 | Describe the principle of lasing and optoelectronics devices in communication system. | | | | | | | | | | | | | | |
| CO4 | Explain the ideas of crystal structure, crystal diffraction and classification of materials. | | | | | | | | | | | | | | |
| CO5 | Express the basics of quantum mechanics and illustrate the quantum mechanical problems. | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 3 | 2 | | | | | | | | | | | | | |
| CO2 | 2 | 2 | | | | | | | | | | | | | |
| CO3 | 1 | 2 | | | | | | | | | | | | | |
| CO4 | 1 | 2 | | | | | | | | | | | | | |
| CO5 | 2 | 2 | | | | | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| UNIT: 1 Oscillation, Wave and Optoelectronics (14 Hours) | | | | | | | | | | | | | | | |
| Introduction to Oscillatory motion, Damped harmonic oscillation and its characteristics, Waves and its characteristics, Superposition of Waves, coherent and incoherent superposition, Interference of light waves, Newton's Ring experiment, diameter of rings, determination of wavelength of unknown light and refractive index of liquid. LASER, Lasing action and characteristics & application of laser beam, construction and working of He-Ne Laser, applications of Laser. Optical fiber, Acceptance angle, Numerical aperture, Step index and Graded index fibers, Attenuations in optical fibers, Block diagram of optical fiber communication systems and applications. | | | | | | | | | | | | | | | |
| UNIT: 2 Electromagnetic Theory (12 Hours) | | | | | | | | | | | | | | | |
| Review of grad, divergence and curl, Gauss divergence theorem and Stoke's theorem (no derivations), fundamental laws of electrostatics, magneto-statics and electromagnetism, displacement current and conduction current, Maxwell's equations, Equation of continuity using Maxwell's Relations. Electromagnetic wave and its characteristics, electromagnetic wave equation for free space and in charge free conducting medium, electromagnetic energy and Poynting vector, Poynting theorem. | | | | | | | | | | | | | | | |
| UNIT: 3 Solid state Physics (14 Hours) | | | | | | | | | | | | | | | |
| Crystal Structure: crystal direction and plane, Miller indices, Inter planar spacing, Reciprocal Lattice and its characteristics, Reciprocal Lattice of SC, FCC and BCC, Brillouin Zone, X-ray diffraction (Basic) & Bragg's law, Super Conducting Materials: Origin, type-1 and type-2, meissner's effect, critical magnetic field and current density, Applications. Magnetic Materials: Properties of Magnetic Materials types and applications. Di-electric Materials: Polar and non-polar dielectric, types of dielectric, piezoelectric, pyro-electric and ferroelectric, Applications. Nano Materials: (elementary ideas) Surface to volume ratio, graphene, carbon nano tubes and their applications. | | | | | | | | | | | | | | | |

UNIT: 4 Quantum Mechanics**(12 Hours)**

Introduction to dual nature: Black body radiation, photoelectric effect, Compton effect (qualitative ideas only), de-Broglie's hypothesis, Heisenberg's uncertainty principle and its application to non-existence of electron inside the nucleus and ground state energy of one dimensional harmonic oscillator, Basic postulates of Quantum Mechanics, Wave function and its characteristics, probability density, normalization, eigen values, eigen functions and expectation values, Schrödinger's equation (time dependent and time independent). Application of Schrödinger equation to particle in a box and its Energy eigen values, Qualitative ideas on potential step and potential barrier with transmission probability.

Teaching Methods: Chalk& Board/ PPT/Video Lectures

Text Books:

1. *Engineering Physics* by D. K. Bhattacharya and Poonam Tanden, Oxford University Press.
2. *Engineering Physics*, H K Malik and A K Singh, Tata McGraw Hill, MGH.

Reference Books:

1. Materials Science & Engg., V. Raghvan, Prentice Hall of India.
2. Concepts of Modern Physics, A. Beiser, S. Mahajan and S.R. Choudhary, Tata McGraw Hill.
3. Lasers & Optical engineering, P Dass, Narosa Publishers, Springer Publisher.
4. Engineering Physics by B. B. Swain and P. K. Jena, KitabMahal, Cuttack
5. Sears & Zemansky's University Physics with Modern Physics, Young and Freedman.
6. Fundamental of Physics, Halliday & Resnick, Wiley Publisher.

| Lab Code | Name of the Lab | L | T | P | C | QP | | | | | | | | | | |
|--|--|----------|----------|----------|----------|----|---|---|---|----|----|----|------|---|---|--|
| 21BBSBS10102 | Engineering Physics Laboratory | 0 | 0 | 2 | 1 | | | | | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | | |
| CEO1 | Providing fundamental information on basic instruments and their uses. | | | | | | | | | | | | | | | |
| CEO2 | To familiarize with different apparatus and applications to different experiments. | | | | | | | | | | | | | | | |
| Course Outcomes: Upon successful completion of this course, students should be able to: | | | | | | | | | | | | | | | | |
| CO1 | Understand the concepts of oscillation and waves through experimental observation. | | | | | | | | | | | | | | | |
| CO2 | Study and explain the experimental observation of interference and diffraction pattern | | | | | | | | | | | | | | | |
| CO3 | Interpret the fundamental characteristics of various materials and semiconductor materials through experiments | | | | | | | | | | | | | | | |
| CO4 | Analyze the quantum concept of light by experimental observation. | | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | 2 | | 1 | 1 | | | | | | | | | | | | |
| CO2 | 2 | | 1 | 1 | | | | | | | | | | | | |
| CO3 | 2 | | 1 | 1 | | | | | | | | | | | | |
| CO4 | 2 | | 1 | 2 | | | | | | | | | | | | |
| List of Experiments: | | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none"> 1. Determination of the acceleration due to gravity by using Bar/Kater's pendulum. 2. Verification of the laws of transverse vibration by using sonometer. 3. Determination of Rigidity modulus of a wire by Static/Dynamic method. 4. Determination of wavelength of light by Newton's Rings apparatus. 5. Determination of no. of lines of a diffraction grating plate. 6. Determination of slit width of a double slit. 7. Determination of plank's constant using photo-voltaic cell. 8. Determination of band gap energy of PN junction (Ge/Si) diode. 9. Determination of the resistivity of a semiconductor with temperature by four- probe method. 10. Determination of dielectric constant of given solid by Lecher wire method. | | | | | | | | | | | | | | | | |
| <u>Add on Experiments</u> | | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none"> 11. Determination of coefficient of Thermal conductivity (K) of a metal (Cu) by using Searle's apparatus. 12. Study of mono-chromaticity and divergence of the given laser beam. 13. Study of reflection and total internal reflection by optical fibers. 14. Study of B-H curve of ferromagnetic substance. 15. Study the Hall Effect. | | | | | | | | | | | | | | | | |

Practical Text Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

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|---|---|---|---|---|-------------------|---|---|---|---|----|----|----|------|---|---|--|
| Subject Code | Title of the subject | | | | | L | T | P | C | | | | | | | |
| 21BBSBS10003 | Engineering Chemistry | | | | | 3 | 0 | 0 | 3 | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | | |
| CEO1 | To impart the knowledge of application of chemical sciences in the field of engineering | | | | | | | | | | | | | | | |
| CEO2 | To give an idea about microscopic chemistry in terms of atomic and molecular orbitals. | | | | | | | | | | | | | | | |
| CEO3 | The course aims at elucidating principles of applied chemistry in industrial systems, water treatment and engineering materials | | | | | | | | | | | | | | | |
| CEO4 | To give detailed knowledge about the reactivity of metal with environment and its prevention from corrosion. | | | | | | | | | | | | | | | |
| CEO5 | To enlighten the students with the applications of advanced materials. | | | | | | | | | | | | | | | |
| Course Outcomes: Upon successful completion of this course, students should be able to: | | | | | | | | | | | | | | | | |
| CO1 | The students will be able to analyze microscopic chemistry in terms of atomic and molecular orbitals. | | | | | | | | | | | | | | | |
| CO2 | Identify suitable water treatments techniques for domestic and industrial purposes | | | | | | | | | | | | | | | |
| CO3 | Differentiate various types of corrosion, and gain knowledge on control measures associated with corrosion | | | | | | | | | | | | | | | |
| CO4 | Understand various types of polymers, their preparation along with applications | | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | 2 | 2 | | | | | | | | | | | | | | |
| CO2 | 3 | 1 | | | | | 1 | | | | | | | | | |
| CO3 | 3 | 1 | | | | | | | | | | 1 | | | | |
| CO4 | 2 | 1 | | | | | 1 | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | | |
| UNIT:1 ATOMIC AND MOLECULAR STRUCTURE | | | | | (10 Hours) | | | | | | | | | | | |
| Schrodinger's wave equation(no derivation), Significance of wave functions, Particle in a box, Application for conjugated molecule, Molecular Orbital theory and Energy level diagram for Homodiatomic molecules of H ₂ , N ₂ , O ₂ & F ₂ , and Hetero diatomic molecule CO & NO | | | | | | | | | | | | | | | | |
| UNIT:02 WATER CHEMISTRY | | | | | (10 Hours) | | | | | | | | | | | |
| Types of Hardness, Determination of Hardness by EDTA method, Treatment of water for Domestic use, Water softening processes Lime-soda process, Ion Exchange method, Boiler feed water, Scale and Sludge, Caustic embrittlement, Carbonate and phosphate conditioning, Colloidal conditioning, Calgon conditioning. | | | | | | | | | | | | | | | | |
| UNIT: 03 CORROSION | | | | | (10 Hours) | | | | | | | | | | | |
| EMF, Relation between E.M.F and free energy, Electrochemical series , Galvanic series, Faraday's Law of Electrolysis, Definition of corrosion, Types of corrosion: Dry corrosion and wet corrosion, Galvanic corrosion, Concentration cell corrosion, Factors influencing corrosion, Corrosion control: Cathodic protection (Sacrificial anodic protection and Impressed current cathodic protection), Protective coatings: Electroplating , Galvanization and Tinning. | | | | | | | | | | | | | | | | |

UNIT: 04 POLYMER CHEMISTRY**(10 Hours)**

Introduction, polymer, Classification of polymers, Plastics: Thermosetting and thermoplastic pastics, Preparation , Properties and uses of different plastics such as PVC, PE, PTFE, Bakelite, Nylon-6,6, Conducting Polymer (Polyaniline, Polyacetylene), Bio-Degradable and Non-Bio Degradable polymer.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Journals

Text Books:

1. Engineering chemistry by Jain & Jain, Dhanpat Rai publishing company (p) Ltd.

Reference Books:

1. A Text Book of Engineering Chemistry by S.S.Dara, S Chand Publishers.
2. A Text Book of Engineering Chemistry by Sashi Chawla, Dhanpat Rai Publishing house.
3. Text Book of Engineering Chemistry, 2nd edition, by R.Gopalan, D.Venkapaya & Sulochana Nagarajan, Vikas Publishing House Pvt. Ltd.
4. B. Tech Chemistry- I and II by P. K. Kar, S. Dash, B. Mishra kalyani publishers.
5. Physical Chemistry By P.W Atkins
6. Engineering Chemistry (NPTEL Web Book) by B . L Tembe, Kamaluddin and M.S. Krishna
7. Essentials of Physical Chemistry, Bahl & Tuli, S.Chand Publishing
8. Applied Chemistry, Sunita Rattan, Kataria
9. Engineering Chemistry, Baskar, Wiley
10. Engineering Chemistry Fundamental and Applications, Shikha Agarwal (Second Edition) 2019, Cambridge University Press.
11. University chemistry by B.H. Mahan.

| Lab Code | Name of the lab | L | T | P | C | QP | | | | | | | | | | |
|--|--|---|---|---|---|----|---|---|---|----|----|----|------|---|---|--|
| 21BBSBS10103 | Engineering Chemistry Laboratory | 0 | 0 | 2 | 1 | | | | | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | | |
| CEO | To train the students about the applications of chemical sciences in the field of engineering and technology | | | | | | | | | | | | | | | |
| Course Outcomes: Upon successful completion of this course, students should be able to: | | | | | | | | | | | | | | | | |
| CO1 | Understand the basic methods of chemical analysis and instrumentations involved | | | | | | | | | | | | | | | |
| CO2 | Standardize of Chemicals | | | | | | | | | | | | | | | |
| CO3 | Estimate the hardness, ions in salts and compositions in ores estimation appropriate consideration for the public health and safety and environmental consideration. | | | | | | | | | | | | | | | |
| CO4 | Synthesizes the drugs and know about their applications | | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | 1 | | 1 | 2 | | | | | | | | | | | | |
| CO2 | 1 | | 2 | 2 | | | | | | | | | | | | |
| CO3 | | | 2 | 2 | | | 1 | | | | | | | | | |
| CO4 | 1 | | 1 | | | | | | | | | 3 | | | | |
| List of Experiments: | | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none"> Determination of amount of OH⁻ and CO₃²⁻ present in supplied water sample. Determination of total hardness of water. Standardization of KMnO₄ using sodium oxalate. Determination of ferrous ion in Mohr's salt by standardized KMnO₄. Determination of percentage of dissolved oxygen in given water sample. Estimation of available chlorine in bleaching powder/ chloride content. Determination of rate constant of acid catalyzed hydrolysis of ester. Preparation of drug (aspirin/Paracetamol). Adsorption of acetic acid by charcoal. Acid value of oil. Determination of strength of HCl and CH₃COOH acid from the mixture of acids using NaOH by Conductrometry. Determination moisture and ash content of coal. Determination of partition coefficient of iodine in benzene and water. Preparation and determination of pH of buffer solution. Determination of viscosity of supplied sample. | | | | | | | | | | | | | | | | |
| Add on Laboratory | | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none"> Synthesis of materials by solgel technology Synthesis of hybrid materials by microemulsion technique Separation and purification technique (Homogeneous Mixture) Synthesis of Polystyrene and determination of molecular weight by UV method Preparation of Soap and Sanitizer | | | | | | | | | | | | | | | | |

Practical Text Books:

- Chemistry Practicals By S. Dara.
- Theory and Practicals of Engineering Chemistry By Dr Sunita Ratan S.K. Kataria & Sons; Reprint 2012 edition (2013).

| | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|----|----|-------------------|------|---|---|
| Subject Code | Title of the subject | | | | | | | | | | | L | T | P | C |
| 21BBSES10001 | Basic Electrical and Electronics Engineering | | | | | | | | | | | 3 | 0 | 0 | 3 |
| Course Outcomes: Upon successful completion of this course, students should be able to: | | | | | | | | | | | | | | | |
| CO1 | Understand basics of Electrical Engineering and to solve DC, single and three phase AC electrical networks mathematically. | | | | | | | | | | | | | | |
| CO2 | Acquire knowledge about the magnetic circuit and fundamental principles of AC & DC machines. | | | | | | | | | | | | | | |
| CO3 | To acquire the knowledge about the characteristics and working principles of semiconductor diodes, Bipolar Junction Transistor. | | | | | | | | | | | | | | |
| CO4 | To get an insight about the basic introduction of Digital electronics | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 2 | 1 | | | | | | | | | | | | | |
| CO2 | 3 | 2 | | | | | | | | | | | | | |
| CO3 | 3 | 2 | | | | | | | | | | | | | |
| CO4 | 3 | 3 | | | | | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| Unit – I | | | | | | | | | | | | [12 Hrs] | | | |
| DC Circuits & Theorems: Introduction to electrical terminology; Ohm's Law, Equivalent Resistance, Series-parallel circuits, Star-delta transformation, Types of elements, Source conversion, Ideal and practical voltage & current sources; Kirchhoff's Law, Mesh and Nodal Analysis, Superposition theorem, Thevenin's theorem, Norton's theorem excited by independent sources. | | | | | | | | | | | | | | | |
| Single Phase AC Circuits: AC Fundamentals: RMS & Average value, Form and peak factors, Complex algebra, Concepts of reactance, Impedance and their representation, AC through pure R, L, C, series RL, series RC & series RLC circuit. | | | | | | | | | | | | | | | |
| Unit – II: | | | | | | | | | | | | [12 Hrs.] | | | |
| Three-phase AC Circuits: Comparison between 1-ph & 3-ph AC circuit, Star & Delta connection, Relation between line and phase quantities. | | | | | | | | | | | | | | | |
| Magnetic Circuits: Magnetic flux, Magnetic flux density, Magnetic fields intensity, Relation between B & H, Reluctance, B-H curve, Analogy between Electric and Magnetic circuit, Leakage flux, Hysteresis loss, Eddy current loss. | | | | | | | | | | | | | | | |
| DC Machines: Introduction, Construction and working principle of DC generator and DC motor, Types of DC machine, EMF equation of DC generator. | | | | | | | | | | | | | | | |
| AC Machines: Construction and working principle of Single-phase Transformer, EMF equation, Transformation ratio, threephase Induction motor: Principle of operation, Rotating magnetic field, Types of rotors, Synchronous speed and slip, Introduction to 1-phase Induction motor. | | | | | | | | | | | | | | | |

Unit – III**[12 Hrs.]**

Semiconductor Diodes: Introduction; Ideal Diode; Semiconductor Materials; Energy Levels; Extrinsic Materials- n - and p -Type; Semiconductor Diode; Resistance Levels; Diode Equivalent Circuits; Half-Wave Rectification; Full-Wave Rectification.

Bipolar Junction Transistors: Introduction; Transistor Construction; Transistor Operation; Common-Base Configuration; Transistor Amplifying Action; Common-Emitter Configuration; Common-Collector Configuration.

Unit – IV**[12 Hrs.]**

Electronic Instrumentation: Introduction; Basic Principle; CRT Features; Block Diagram of Oscilloscope; Function Generator; Standard Signal Generator; Digital Multimeters.

Digital Electronics Fundamentals: Binary, Octal, Hexadecimal and Decimal Number System and their Conversion; Binary Arithmetic; 1's and 2's Complements; Axioms and Laws of Boolean Algebra; Reducing Boolean Expressions; Logic Gates; Boolean Expressions and Logic Diagrams.

Teaching Methods: Chalk& Board/ PPT/Video Lectures

Text Books:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. Basic Electrical Engineering, N K De, Dipu Sarkar, University Press, 2016
3. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
4. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. Electronic Devices and Circuit Theory by Robert L Boylestad and Louis Nashelsky, 11th Edition, Prentice Hall.
6. Electronic Instrumentation by H S Kalsi, 3rd Edition, McGraw Hill.
7. Digital Design by M. Morris Mano, 5th Edition, Pearson Education.

Reference Books:

1. Microelectronic Circuits by A. S. Sedra and Kenneth C. Smith, 7th Edition, Oxford University Press.
2. Fundamentals of Digital Circuits, 4th Edition, A. Anand Kumar, PHI.
3. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

| Lab Code | Name of the Lab | L | T | P | C | | | | | | | | | | | |
|--|--|---|---|---|---|---|---|---|---|----|----|----|------|---|---|--|
| 21BBSES10101 | Basic Electrical and Electronics Engineering Laboratory | 0 | 0 | 2 | 1 | | | | | | | | | | | |
| Course Outcomes: Upon successful completion of this course, students should be able to: | | | | | | | | | | | | | | | | |
| CO1 | Experimentally verify the basic circuit theorems | | | | | | | | | | | | | | | |
| CO2 | Measure power and power factor in ac circuits using different lamps | | | | | | | | | | | | | | | |
| CO3 | Understand and identify different parts of AC and DC machines. | | | | | | | | | | | | | | | |
| CO4 | Verify the characteristics of diodes, transistors, OP-amps, digital electronic components experimentally and able to use oscilloscope, signal generator to measure amplitude and frequency of different waveforms. | | | | | | | | | | | | | | | |
| CO5 | Demonstrate the operating principle and VI characteristics of Semiconductor diode and transistor. | | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | |
| CO1 | | 1 | 2 | | | | | | | | | | | | | |
| CO2 | | 2 | 2 | | | | | | | | | | | | | |
| CO3 | | 1 | 2 | | | | | | | | | | | | | |
| CO4 | | 2 | 2 | | | | | | | | | | | | | |
| CO5 | | 2 | 2 | | | | | | | | | | | | | |

SYLLABUS

List of experiments/demonstrations:

Electrical Part:

Observations & Demonstration:

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- Demonstration of cut-out sections of machines: DC machine (commutator- brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.

Experiments: (Any 5 Experiments) :

1. Verification of Superposition, Thevenin's & Norton's Theorem
2. Power factor improvement using capacitor for fluorescent lamp.
3. Calculation of current, voltage and power in series R-L-C circuit excited by single-phase AC supply and calculation of power factor.
4. Open Circuit Characteristics of a separately excited DC Shunt generator
5. Load Characteristics of DC shunt motor
6. Loading of a transformer: measurement of primary and secondary voltages and currents, and power.

Electronics Part: (Any 5 Experiments) :

1. Familiarization of electronic components and devices (testing of semiconductor diodes and transistors using digital multimeter)
2. Study and use of oscilloscope, signal generator to view waveforms and measure amplitude and frequency of a given waveform.
3. V-I characteristics of semiconductor diode and determining its DC and AC resistance.
4. Studies on half-wave and full-wave rectifier circuits without and with capacitor filter; recording of the waveforms and measurement of average and rms values of the rectifier output.
5. V-I characteristic of an n-p-n or p-n-p transistor, DC biasing the transistor in common-emitter configuration and determination of its operating point (i.e., various voltages and currents).
6. Studies on Logic gates (Truth table verification of various gates).

| | | | | | | | | | | | | | | | |
|---|--|---|---|---|---|---|---|---|---|----|----|------------|----------|----------|----------|
| Subject Code | Title of the subject | | | | | | | | | | | L | T | P | C |
| 21BBSES10002 | Elements of Mechanical Engineering | | | | | | | | | | | 3 | 1 | 0 | 4 |
| Pre -Requisite: Math and Physics | | | | | | | | | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1: | To understand the basics of forces and force analysis. | | | | | | | | | | | | | | |
| CEO2: | To apply the established engineering methods to complex engineering problem. | | | | | | | | | | | | | | |
| CEO3: | To understand the fundamental Concepts of thermodynamics and to distinguish the components and working principle of heat engine and determine the COP of heat pump and refrigerator. | | | | | | | | | | | | | | |
| CEO4: | To impart basic knowledge on automation and basic codes in CNC machining. | | | | | | | | | | | | | | |
| Course Outcomes: At the end of the course, the student will be able to: | | | | | | | | | | | | | | | |
| CO1 | Determine the resultant force and moment for given force system. Locate the centroid and compute MOI of composite plane sections. | | | | | | | | | | | | | | |
| CO2 | Evaluate the forces in members of trusses, frames and problems related to friction | | | | | | | | | | | | | | |
| CO3 | To understand the basics of thermodynamics and application of various Laws and gain knowledge on heat power energy systems and its applications. | | | | | | | | | | | | | | |
| CO4 | To enable the students to understand on CNC coding and flexible manufacturing system. | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 3 | 2 | | | | | | | | | | | | | |
| CO2 | 3 | 2 | | | | | | | | | | | | | |
| CO3 | 2 | 2 | | | | | | | | | | | | | |
| CO4 | 3 | 3 | | | | | | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| UNIT:1 | | | | | | | | | | | | [10 hours] | | | |
| STATICS OF PARTICLES | | | | | | | | | | | | | | | |
| <p>Force System: Force, Parallelogram Law, Free body diagram, Determination of reactions, Lami's theorem, Principle of Transmissibility of forces. Moment of a force, Couple, Varignon's theorem, Resolution of a force into a force and a couple. Resultant of coplanar force system. Equilibrium of coplanar force system.</p> <p>Concept of Centre of Gravity: Basic definition of Centroid and centre of mass, Area Moment of Inertia, Perpendicular axis theorem and Parallel axis theorem, Radius of gyration</p> | | | | | | | | | | | | | | | |
| UNIT:2 | | | | | | | | | | | | [10 Hours] | | | |
| ANALYSIS OF TRUSSES AND FRICTION | | | | | | | | | | | | | | | |
| <p>Plane Truss: Perfect and imperfect truss, Assumptions and Analysis of Plane Truss by Method of joints and Method of section.</p> <p>Laws of Friction - Angle of Friction-Angle of Repose-Ladder and Wedge Friction, Numerical problems on ladder and free body diagram on analysis of wedge friction.</p> | | | | | | | | | | | | | | | |

UNIT:3

[14 Hours]

Fundamental Concepts and Definitions: Definition of Thermodynamics, System, surrounding and universe, Macroscopic & microscopic point of view. Property, State, Path, process, Cyclic process, Density, Specific volume, Pressure, temperature. Thermodynamic equilibrium, Quasi-static process, concept of ideal gas, Work and heat transfer, Zeroth law. First law: First law of thermodynamics. Application of first law in non-flow and flow processes. Steady flow energy equation, limitation of first law. Second law: Thermal reservoir, Statements of second law, Heat engines, COP of heat pump and refrigerator. Carnot cycle. Basic concepts of power plant and IC engines. Numerical based on simple formula.

UNIT:4

[8 Hours]

Robotics and Automation

Basic concept of Robotics and its Classification, Numerical Control of machine tools, Introduction to CNC machine, Basic codes used in CNC, Introduction to Flexible manufacturing system.

Teaching Methods: Chalk& Board, PPT, Blended , Cut Model Demonstrations

Text Books:

1. Engineering Mechanics by S. S. Bhavikatti, K. G. Rajashekarappa, New Age International
2. Engineering Mechanics by R K Bansal, Laxmi Publications
3. Basic Mechanical Engineering by Agrawal&Agrawal, Wiley
4. Engineering Thermodynamics by P.K.Nag, McGraw Hill
5. Machine tool design by N.K Meheta, McGraw Hill, Third edition,2018
6. Computer aided Design and Manufacturing by Mikell P. Groover,McGraw-Hill Inc, 2007

Ref. Books:

1. S.Timoshenko, and D.H.Young, "Engineering Mechanics", Tata Mc-Graw Hill Book,5th edition
2. Engineering Mechanics: Statics by J.L Meriam , Wiley
3. Engineering Mechanics : Statics and Dynamics by R. C. Hibbler, Pearson
4. Thermodynamics An Engineering Approach by Cengel& Boles, McGraw Hill
5. An Introduction to Mechanical Engineering by Wickert & Lewis, Cengage Learning
6. Thermal engineering by domkundwar and kothandaraman, Dhanpatrai Publishing Company

| Subject Code | Title of the subject | | | | | | | | | | L | T | P | C | |
|---|---|---|---|---|---|---|---|---|---|----|----------|----------|----------|----------|---|
| 21BBSHS10002 | Human Values and Professional Ethics | | | | | | | | | | 2 | 0 | 0 | 2 | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1 | To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings. | | | | | | | | | | | | | | |
| CEO2 | To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way. | | | | | | | | | | | | | | |
| CEO3 | To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature. | | | | | | | | | | | | | | |
| Course Outcomes: At the end of the course, the student will be able to: | | | | | | | | | | | | | | | |
| CO1 | It ensures students sustained happiness through identifying the essentials of human values and skills. | | | | | | | | | | | | | | |
| CO2 | It facilitates a correct understanding between profession and happiness. | | | | | | | | | | | | | | |
| CO3 | It helps students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature. | | | | | | | | | | | | | | |
| CO4 | Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life. | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | | | | | | | 1 | 3 | 2 | | | 1 | | | |
| CO2 | | | | | | | | | 2 | | | 2 | | | |
| CO3 | | | | | | | 3 | 3 | 3 | | | 3 | | | |
| CO4 | | | | | | | 2 | 3 | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education. [8 Hrs] | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none"> Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario | | | | | | | | | | | | | | | |
| UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself! [6 Hrs] | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none"> Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: <i>Sanyam</i> and <i>Swasthya</i>; correct appraisal of Physical needs, meaning of Prosperity in detail | | | | | | | | | | | | | | | |

UNIT 3: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence. [6 Hrs]

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
3. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
4. Holistic perception of harmony at all levels of existence

UNIT 4: Implications of the above Holistic Understanding of Harmony on Professional Ethics. [10 Hrs]

1. Natural acceptance of human values
2. Definitiveness of Ethical Human Conduct
3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
4. Competence in professional ethics:
5. Ability to utilize the professional competence for augmenting universal human order
6. Ability to identify the scope and characteristics of people-friendly and eco- friendly production systems,
7. Ability to identify and develop appropriate technologies and management patterns for above production systems.
8. Case studies of typical holistic technologies, management models and production systems

TEXT BOOK(s):

R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

REFERENCES BOOKS:

1. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
3. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986,1991
4. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and HarperCollins, USA
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *limits to Growth*, Club of Rome's Report, and Universe Books.

| | | | | | | |
|----------------------|---------------------------------|----------|----------|----------|----------|--|
| Title of the subject | | | | | | |
| Subject Code | | L | T | P | C | |
| 21BBSES10004 | Dietetics and Nutritions | 2 | 0 | 0 | 2 | |

Course Educational Objective

CEO1: Graduates can understand the importance of diet for good health

CEO2: Graduates should know about balance diet, menu planning and critically evaluation of meal

Course outcomes: At the end of the course, the student will be able to:

CO1 Know about importance of health and balance diet

CO2 Understand about composition of human diet and their function

CO3 Acquire knowledge on role of vitamins and minerals in food

CO4 Get an idea about menu planning and critically evaluation of meal

| COs | PROGRAMME OUTCOMES(POs) | | | | | | | | | | | |
|-----|-------------------------|---|---|---|---|---|---|---|---|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CO1 | 2 | | | | | | | | | | | |
| CO2 | | 3 | | | | | | | | | | |
| CO3 | 1 | | | | | | | | | | | 2 |
| CO4 | | 2 | | | | | | | | | | |

UNIT:1

10 Hours

Basic Aspects

A. Definition of the terms Health, Nutrition and Nutrients

B. Importance of food (Physiological, Psychological and social function of food) in maintaining good health.

C. Classification of nutrients, Balanced diet, food groups

Balanced Diet

- Definition
- Importance of balanced diet

D. RDA for various nutrients- age, gender, physiological state

UNIT:2

10 Hours

Macronutrients

Carbohydrates

- Definition
- Classification(Mono, di and polysaccharides)
- Dietary Sources
- Function- Excess

Lipids

- Definition
- Classification
- Dietary Sources
- Functions

Protein

- Definition
- Classification based upon amino acid composition
- Dietary sources
- Functions
- Methods of improving quality of protein in food(special emphasis on soya protein and whey protein)

Energy

- Definition of Energy and Units of its measurement (Kcal)
- energy contribution from macronutrients(carbohydrates proteins, and fat)
- Factors affecting energy requirements
- Concept of BMR, SDA
- Dietary Sources of energy
- Concept of energy balance and the health hazards associated with Underweight, Overweight

Water

- Definition
- Dietary Sources (visible, invisible)
- Function of water
- Role of water maintaining health (water balance)

UNIT:3**8 Hours****Macronutrients****A. Vitamins**

- Definition and classification (water and fat soluble vitamins)
- Food Sources, function and significance of
 1. Fat soluble vitamins (Vitamin A, D, E, K)
 2. Water soluble vitamins (Vitamin C, Thiamine, Riboflavin, Niacin, Cyanocobalamin and Folic acid)

B. Minerals

- Definition and classification (major and minor)
- Food Sources, functions and significance of calcium, Iron, Sodium, Iodine and Fluorine

UNIT:4**6Hours****Digestion and Absorption**

Mechanical and Chemical breakdown of food

Menu Planning

- Planning of nutritionally balanced meals based upon the three food group system
- Factor affecting food planning
- Critical evaluation of few meals served at the Institutes/Hotels based on the principle of meal planning
- Calculation of proximate principles and energy of 3 Indian and 3 Conti lunch menus
- Critical evaluation and suggested improvement.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert/MOOCs

Text Books

1. Food Science and nutrition- Sunetra Roday
2. Food hygiene and sanitation –Sohna Roda
3. Nutrition and Dietetics by Shubhangini A. Joshi

Ref. Books

1. Food Science- Porter and Hotchkin
 2. Advanced Nutrition and Dietetics in Nutrition Support
- Editor(s): Mary Hickson PhD RD,, Sara Smith PhD RD,, Kevin Whelan PhD RD FBDA,

| SUBJECT CODE | TITLE OF THE SUBJECT | L | T | P | C |
|--------------|----------------------|---|---|---|---|
| 21BBSES10106 | Engineering Workshop | 1 | 0 | 2 | 2 |

Pre Requisite: Concept of Measurement and dimension.

Course Educational Objectives:

| | |
|------|---|
| CEO1 | To learn the different types of hand and machine tools for various industrial application. |
| CEO2 | To familiarize with the basic manufacturing processes and to study various tools and equipment used hands on training is given in different sections. |
| CEO3 | To know principle of metrology and measurement in industries. |
| CEO4 | To develop basic principles and devices involved in measuring and surface textures. |

Course Outcomes: Upon successful completion of this course, students should be able to:

| | |
|-----|--|
| CO1 | Understand various safety precautions and identify the use of different hand tools, machine tools and their operation. |
| CO2 | Demonstrate the process configuration and basic mechanism of different machines like Lathe, Shaper, Milling machine, Drilling machine, Grinding machine and CNC. |
| CO3 | Apply welding and fabrication knowledge and skills to meet expectation of various industries. |
| CO4 | Identify various measuring tools and device such as Sine bar, Slip gauge, Surface roughness tester, and express error of various measuring devices. |

CO-PO & PSO Mapping

| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | |
|-----|--------------------|---|---|---|---|---|---|---|---|----|----|----|------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| CO1 | 1 | | | 1 | | | | | | | | | | |
| CO2 | 2 | | | 2 | | | | | | | | | | |
| CO3 | 1 | | | 3 | | | | | | | | | | |
| CO4 | 1 | | | 3 | | | | | | | | | | |

Minimum:10 Experiments

Unit 1

Safety Precaution: To study the various Safety precautions in workshop.

Fitting :

Study of different hand tools and Machine tools used in fitting.

Unit 2

Machining:

Study of various components and working principle of lathe machine

Preparation of a cylindrical job by lathe (Facing, Taper turning, Step Turning, knurling)

Study on Shaper and Milling Machine.

Overview to CNC Lathe machine.

Unit 3

Welding Practice :

Hands on practice on Electric Arc Welding to prepare Lap Joint, Butt Joint, T Joint and Corner Joint.

Preparation of Lap joint with the help of Oxyacetylene Gas welding.

Unit 4

Measurement and Calibration :

Measurement of length, height and diameter by Vernier caliper and Micrometer

Angular measurement by using sine bar.

Measurement of flatness of surface plate by using spirit levels.

Measurement of surface roughness using surface roughness tester.

Calibration of LVDT using indicator / CRO

Calibration of load cell using electrical resistance strain gauge.

Calibration of thermocouples.

Teaching Methods: Chalk & Board, Hands on practice.

Text Books:

1. Elements of Workshop Technology, Vol. I and II by Hajra choudhary, Khanna Publishers (7th Edition 2011)
2. Workshop Technology by WAJ Chapman, Viva Books (5th Edition 1985)

Reference Books:

Workshop Manual by Kannaiah / Narayana, Scitech Publicaitons(P) Ltd. (3rd Edition 2015)
Mechanical measurement, instrumentation and control by A.K. sawhney and Punnet sawhney ,
Dhanpat Rai Publication (7th Edition 2017)
Engineering Metrology R.K. Jain, Khanna Publication (7th Edition 2018).

| SUBJECT CODE | TITLE OF THE SUBJECT | | | | | | | | | | | L | T | P | C |
|--|---|---|---|---|---|---|---|---|---|----|----|----|------|---|---|
| 21BBSES10105 | Engineering Graphics & Design Lab | | | | | | | | | | | 1 | 0 | 2 | 2 |
| Pre –Requisite: | | | | | | | | | | | | | | | |
| Course Educational Objectives | | | | | | | | | | | | | | | |
| CEO1 | To enable students to acquire and use engineering drawing skills as a means of accurately and clearly communicating ideas, information and instructions | | | | | | | | | | | | | | |
| CEO2 | To enable students to acquire requisite knowledge, techniques and attitude required for advanced study of engineering drawing and basic of AUTOCAD. | | | | | | | | | | | | | | |
| Course Outcomes: Upon successful completion of this course, students should be able to: | | | | | | | | | | | | | | | |
| CO1 | Able to prepare the orthographic projections of points and straight lines placed in various quadrants | | | | | | | | | | | | | | |
| CO2 | Demonstrate the ability to draw orthographic projections of various solids. | | | | | | | | | | | | | | |
| CO3 | Ability to draw and interpret the sectioned views of solids | | | | | | | | | | | | | | |
| CO4 | To provide students with adequate knowledge and experience in preparing engineering drawings using AutoCAD | | | | | | | | | | | | | | |
| CO-PO & PSO Mapping | | | | | | | | | | | | | | | |
| COs | PROGRAMME OUTCOMES | | | | | | | | | | | | PSOs | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | |
| CO1 | 2 | | | 2 | | | | | | | | | | | |
| CO2 | 2 | | | 3 | | | | | | | | | | | |
| CO3 | 2 | | | 3 | | | | | | | | | | | |
| CO4 | 3 | | | 3 | | | | | | | | | | | |
| Unit 1 | | | | | | | | | | | | | | | |
| Introduction: Drawing Instruments and their uses, BIS conventions, Types of line, Dimensioning line Conventions. | | | | | | | | | | | | | | | |
| Orthographic Projections : | | | | | | | | | | | | | | | |
| Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes. 1-Sheet | | | | | | | | | | | | | | | |
| Unit 2 | | | | | | | | | | | | | | | |
| Orthographic Projections of Plane Surfaces (First Angle Projection Only): | | | | | | | | | | | | | | | |
| Introduction, Definitions–projections of plane surfaces–triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method 1-Sheet | | | | | | | | | | | | | | | |
| Projections of Solids (First Angle Projection Only) : | | | | | | | | | | | | | | | |
| Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions. 1-Sheet | | | | | | | | | | | | | | | |
| Unit 3 | | | | | | | | | | | | | | | |
| Sections and Development of Lateral Surfaces of Solids: | | | | | | | | | | | | | | | |
| Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. 1 – Sheet | | | | | | | | | | | | | | | |

Unit 4**AUTO CAD:**

Layout of the software, standard tool bar/menus and description of most commonly used toolbars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints.

Teaching Methods: Chalk& Board, Computer software(AUTO CAD)

TEXT BOOKS

Engineering Drawing - N.D. Bhatt & V.M. Panchal, Charotar Publishing House, Gujarat.
Computer Aided Engineering Drawing - S. Trymbaka Murthy, 4th Ed, University Press
Engineering Drawing by N.S. Parthasarathy and Vela Murali Oxford University Press.

Reference Books

Engineering Graphics - K.R. Gopalakrishna, Subash Publishers Bangalore.
Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production-Luzadder Warren J., Duff John M., Eastern Economy Edition, Prentice-Hall of India Pvt. Ltd., New Delhi.
Computer Aided Engineering drawing, Prof. M. H. Annaiah, New Age International Publisher, New Delhi