

Pimpri Chinchwad Education Trust's
Pimpri Chinchwad College of Engineering
SECTOR NO. 26, PRADHIKARAN, NIGDI, PUNE 411044

An Autonomous Institute Approved by AICTE and affiliated to SPPU, Pune

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES
Department of Computer Engineering



Curriculum Structure and Syllabus
of
FY B Tech Computer Engineering
FY B Tech Computer Engineering
(Regional Language)
(Course 2023)



Effective from Academic Year 2023-24

Institute Vision

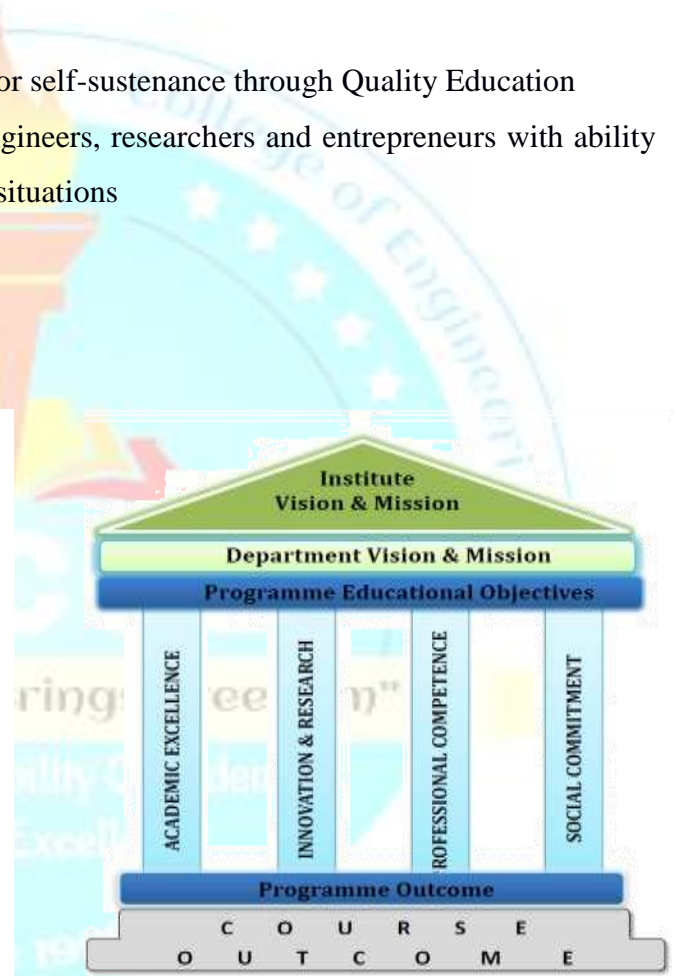
To be one of the top 100 Engineering Institutes of India in coming five years by offering exemplarily Ethical, Sustainable and Value Added Quality Education through a matching ecosystem for building successful careers.

Institute Mission

1. Serving the needs of the society at large through establishment of a state-of-art Engineering Institute.
2. Imparting right Attitude, Skills, Knowledge for self-sustenance through Quality Education
3. Creating globally competent and Sensible engineers, researchers and entrepreneurs with ability to think and act independently in demanding situations

Quality Policy

We at PCCOE are committed to impart Value Added Quality Education to satisfy the applicable requirements, needs and expectations of the Students and Stakeholders. We shall strive for academic excellence, professional competence and social commitment in fine blend with innovation and research. We shall achieve this by establishing and strengthening state-of- the-art Engineering and Management Institute through continual improvement in effective implementation of Quality ManagementSystem.



LIST OF ABBREVIATIONS IN CURRICULUM STRUCTURE

| Sr. No. | ABBREVIATION | TYPE OF COURSES |
|---------|--------------|--|
| 1 | BSC | Basic Science Course |
| 2 | ESC | Engineering Science Course |
| 3 | VSEC | Vocational and Skill Enhancement Course |
| 4 | AEC | Ability Enhancement Course |
| 5 | PCC | Programme Core Course |
| 6 | CC | Co-curricular Courses |
| 7 | HSMC | Humanities/ Social Sciences/Management Courses |
| 8 | B.Tech | Bachelor of Technology |
| 9 | L | Lecture |
| 10 | P | Practical |
| 11 | T | Tutorial |
| 12 | H | Hours |
| 13 | CR | Credits |
| 14 | CIE | Continuous Internal Evaluation /Examination |
| 15 | IE | Internal Evaluation |
| 16 | MTE | Mid Term Evaluation |
| 17 | ETE | End Term Evaluation |
| 18 | TW | Term work |
| 19 | OR | Oral |
| 20 | PR | Practical |
| 21 | LS | Life Skills |
| 22 | UHV | Universal Human Values |
| 23 | Eng. | English |
| 24 | Jap. | Japanese |
| 25 | Ger. | German |
| 26 | IKS | Indian Knowledge system |

First Year B.Tech Computer Engineering: Semester-I

| Course Code | Course Type | Course Name | Teaching Scheme | | | | | | Evaluation Scheme | | | | | | | |
|-------------------|-------------|---|-----------------|-----------|----------|-----------|-----------|----------|-------------------|----|-----|-----|-----|----|----|------------|
| | | | L | P | T | H | CR | | | IE | MTE | ETE | TW | PR | OR | Total |
| | | | | | | | TH | PR/Tut | Total | | | | | | | |
| BSH21A01 | BSC | Linear Algebra & Univariate Calculus | 2 | | 1 | 3 | 2 | 1 | 3 | 20 | 30 | 50 | - | - | - | 100 |
| BSH21A04 | BSC | Engineering Chemistry | 3 | - | - | 3 | 3 | - | 3 | 20 | 30 | 50 | - | - | - | 100 |
| BSH21A05 | BSC | Engineering Chemistry Laboratory | | 2 | | 2 | | 1 | 1 | | | | 50 | | | 50 |
| BCE21B01 | ESC | Computer Programming and Problem Solving | 3 | | | 3 | 3 | - | 3 | 20 | 30 | 50 | - | - | - | 100 |
| BCE21B02 | ESC | Digital Electronics and Computer Organization | 3 | | | 3 | 3 | - | 3 | 20 | 30 | 50 | - | - | - | 100 |
| BCE21B03 | ESC | Digital Electronics Laboratory | | 2 | | 2 | - | 1 | 1 | | | | 50 | | | 50 |
| BCE21G01 | VSEC | Computer Programming and Problem Solving Laboratory I | | 4 | | 4 | - | 2 | 2 | | | | 100 | | | 100 |
| BSH21H01/02/03/04 | AEC | AEC (Eng/Ger/Jap/Business story telling) | 1 | 2 | | 2 | 1 | 1 | 2 | 30 | | 20 | | | | 50 |
| BSH21K01 | CC | Life Skill 1 | | 4 | | 4 | | 2 | 2 | | | | 100 | | | 100 |
| Total | | | 12 | 14 | 1 | 26 | 12 | 8 | 20 | | | | | | | 750 |

First Year B.Tech Computer Engineering: Semester-II

| Course Code | Course Type | Course Name | Teaching Scheme | | | | | | Evaluation Scheme | | | | | | | |
|--------------|-------------|--|-----------------|-----------|----------|-----------|-----------|----------|-------------------|----|-----|-----|-----|----|----|------------|
| | | | L | P | T | H | CR | | | IE | MTE | ETE | TW | PR | OR | Total |
| | | | | | | | TH | PR/Tut | Total | | | | | | | |
| BSH22A06 | BSC | Multivariate Calculus | 2 | | 1 | 3 | 2 | 1 | 3 | 20 | 30 | 50 | - | - | - | 100 |
| BSH22A02 | BSC | Engineering Physics | 3 | | | 3 | 3 | | 3 | 20 | 30 | 50 | - | - | - | 100 |
| BSH22A03 | BSC | Engineering Physics Laboratory | | 2 | | 2 | | 1 | 1 | | | | 50 | - | | 50 |
| BCE22B04 | ESC | Object Oriented Programming | 3 | | | 3 | 3 | - | 3 | 20 | 30 | 50 | | | | 100 |
| BCE22B05 | ESC | Object Oriented Programming Laboratory | | 4 | | 4 | - | 2 | 2 | | | | 50 | | 50 | 100 |
| BCE22C01 | PCC | Discrete Mathematics | 2 | | | 2 | 2 | - | 2 | 20 | | 30 | | | | 50 |
| BCE22G02 | VSEC | Computer Programming and Problem Solving Laboratory II | | 4 | | 4 | - | 2 | 2 | | | | 100 | | | 100 |
| BSH22H05 | IKS | Indian Knowledge system | 2 | - | - | 2 | 2 | - | 2 | 30 | - | 20 | - | - | - | 50 |
| BSH22K01 | CC | Life skill 2 | - | 4 | - | 4 | - | 2 | 2 | - | - | - | 100 | - | - | 100 |
| Total | | | 12 | 14 | 1 | 27 | 12 | 8 | 20 | | | | | | | 750 |

Curriculum Structure

First Year B.Tech

Computer Engineering

Semester I

"Knowledge Brings Freedom"

Progress Credibility Confidence

Optimism Excellence

Since 1999

| | | | | | | | |
|---|---|------------------|---------------|--------------------------|------------|-----------------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | | | Semester: I | |
| Course: Linear Algebra & Univariate Calculus | | | | | | Code: BSH21A01 | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial* | Credit | IE | MTE | ETE | Total |
| 2 | - | 1 | 3 | 20 | 30 | 50 | 100 |
| Prior Knowledge: 1) Elementary Mathematics. 2) Elementary Calculus is essential | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <ol style="list-style-type: none"> 1) To familiarize with concepts and techniques in Calculus and Matrices. 2) To get acquainted with Mathematical Modeling of physical systems using differential equations. 3) To acquire techniques of advanced level mathematics and its applications that would enhance analytical thinking power. | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to:</p> <ol style="list-style-type: none"> 1) Apply the concept of rank to solve Electrical Circuits problems and Find Eigenvalues and Eigenvectors. 2) Represent Fourier series for the periodic time domain continuous and discrete function into signal form. 3) Use Successive differentiation & Taylor's and Maclaurin's theorems for expansion of a function in infinite series and evaluate the limits of indeterminate forms with L'Hospital rule. 4) Develop and solve models related to Orthogonal Trajectories, Electrical Circuits and One dimensional heat flow using differential equations. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Matrices: Rank, System of linear equations with applications in Electrical circuits, Linear dependence and independence, Linear transformations, Eigenvalues, Eigen vectors. | | | | | | 8 |
| 2 | Fourier Series: Definition, Dirichlet's conditions, full range Fourier series, Harmonic analysis, and application to engineering. | | | | | | 7 |
| 3 | Differential Calculus: L' Hospital rule, Taylor's series, Maclaurin's series, Successive differentiation and Leibnitz theorem. | | | | | | 7 |
| 4 | Differential Equations: Exact differential equations, differential equations reducible to Exact form, Applications of Differential Equations: Orthogonal trajectories, Kirchoff's law of Electrical circuits (L-R and R-C circuits) , One-dimensional conduction of heat (steady state). | | | | | | 8 |
| Total | | | | | | 30 | |
| * Tutorial will be conducted in batches as 1Hr/week/batch | | | | | | | |
| Sr. No. | List of Tutorials | | | | | | |
| 1 | Rank, System of linear equations, | | | | | | |
| 2 | Applications in Electrical circuits | | | | | | |

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|---|--|
| 3 | Linear dependence and independence, Linear transformations |
| 4 | Eigenvalues, Eigen vectors |
| 5 | Full range Fourier series |
| 6 | Full range Fourier series |
| 7 | Harmonic analysis |
| 8 | Application to engineering |
| 9 | L' Hospital rule, Taylor's series |
| 10 | Maclaurin's series, Successive differentiation |
| 11 | Successive differentiation, Leibnitz theorem |
| 12 | Exact differential equations, |
| 13 | Differential equations reducible to Exact |
| 14 | Orthogonal trajectories, Kirchoff's law of Electrical circuits |
| 15 | One-dimensional conduction of heat |
| Text Books: | |
| 1) Higher Engineering Mathematics by B.V. Ramana , 34e, Tata McGraw-Hill. | |
| 2) Linear Algebra & Univariate Calculus by Team Mathematics, PCCoE, Pune, 1e, Techknowledge Publication. | |
| Reference Books: | |
| 1) Advanced Engineering Mathematics by Erwin Kreyszig, 9e, Wiley Eastern Ltd. | |
| 2) Higher Engineering Mathematics by H. K. Dass , 22e, S. Chand Publication, Delhi. | |
| 3) Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd. | |
| 4) Advanced Engineering Mathematics, by Peter V. O'Neil, 7e, Thomson Learning. | |
| 5) Advanced Engineering Mathematics by M. D. Greenberg, , 2e, Pearson Education. | |
| 6) Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi. | |
| E-sources: | |
| NPTEL Course lectures links: | |
| https://www.youtube.com/watch?v=4QFsiXfgbzM&list=PLbRMhDVUMngeVrxtbBz-n8HvP8KAWBpI5 | |

| Program: B. Tech. (Computer Engineering) | | | | Semester: I | | | |
|---|---|----------|--------|-------------------|-----|-----|-----------------|
| Course: Engineering Chemistry | | | | Code: BSH21A04 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 3 | - | - | 3 | 20 | 30 | 50 | 100 |
| Prior Knowledge: 1) Structure of water. 2) Volumetric analysis. 3) Electromagnetic radiations. 4) Classification and properties of polymers. 5) Fossil and derived fuels. 6) Corrosion and its effects. 7) Electrochemical series. | | | | | | | |
| Course Objectives: This course aims at enabling students, 1) To familiarize students with instrumental methods for qualitative and quantitative analysis and explore the importance of green chemistry. 2) To lead students to investigate the advancement in engineering materials, batteries and structural elucidation by spectroscopy. 3) To build consciousness about the recent development in alternate energy sources and corrosion control. 4) To develop experimental skills and thereby forge their conceptual lucidity. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: 1) Analyse the water quality, interpret techniques of water purification and compare green over traditional synthesis of polycarbonate. 2) Apply basic principles of various electro-analytical techniques for qualitative and quantitative analysis and understand battery technology. 3) Apply the principles, instrumentation of UV & IR spectroscopy for structural elucidation. 4) Perceive the fuel quality and understand the scope of derived alternate fuels 5) Relate the preventive methods of corrosion to real-life problems. 6) Interpret the chemical structure, properties and synthesis of various polymers and nanomaterials and their uses. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Water Technology and Green Chemistry: a) Hardness of water, its types, units of hardness and hardness calculation. Chemical analysis of water by determination of hardness by EDTA method. Alkalinity of water and its determination. Numerical on EDTA method and alkalinity. Disadvantages of hard water in boilers. Water softening techniques: Permutit and Ion exchange method. Dissolved oxygen (DO), biological oxygen demand (BOD) and Chemical oxygen demand (COD). b) Introduction of Green Chemistry: Definition, goals, principles and green synthesis of Polycarbonate. | | | | | | 9 |

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|---|---|---|
| 2 | <p>Instrumental Analysis and battery technology.</p> <p>a) Electrochemistry: fundamentals of an electrochemical cell, EMF of cell, reference and indicator electrodes and Nernst Equation.</p> <p>b) Basic principles, instrumentation and applications of :-</p> <p>i) Conductometry: Introduction, Kohlrausch's law, measurement of conductance and conductometric titrations of strong acid versus strong base, strong acid versus weak base and weak acid versus strong base.</p> <p>ii) pH-metry: theory of buffers and preparation, standardization of pH-meter, titration of weak acid versus strong base, simple and differential plots.</p> <p>iii) Potentiometry: Introduction, principle and application: potentiometric titration of Fe²⁺ versus Ce⁴⁺ along with simple and differential plots.</p> <p>Battery technology and Fuel Cell: introduction and types of batteries, construction, working and applications of Lithium ionbattery, charging and discharging reactions at respective electrodes. H₂- O₂ fuel cell.</p> | 7 |
| 3 | <p>Spectroscopic techniques: Ultra Violet and Infrared spectroscopy</p> <p>a) UV Spectroscopy: nature of electromagnetic radiation and its characteristics. Interaction of matter with UV radiations leading to different electronic transitions. Beer's & Lambert's law, their derivations and applications. Instrumentation of UV - Visible spectrophotometer. Terms used in UV spectroscopy-chromophore, auxochrome, bathochromic shift (red shift), hypochromic shift (blue shift), hyper chromic and hypochromic effect.</p> <p>b) IR spectroscopy: principle, types of vibrations (stretching and bending), Different regions of IR spectrum such as fundamental group region, finger print region and aromatic region. Applications of IR spectroscopy.</p> | 8 |
| 4 | <p>Fuels and combustion</p> <p>a) Fuels: definition, calorific value and its units. Calorific value (CV), gross calorific value (GCV), net calorific value (NCV). Determination of calorific value - Bomb calorimeter, Boy's calorimeter and numerical.</p> <p>i) Solid fuels: coal, proximate and ultimate analysis of coal, numerical based on analysis of coal. ii) Liquid fuels: composition of petroleum, refining of petroleum. Synthesis, properties, advantages and disadvantages of Power alcohol and Biodiesel. iii) Gaseous fuels: Hydrogen gas as a future fuel, production by steam reforming of methane and by electrolysis of water. Challenges in storage and transportation of H₂ gas.</p> <p>b) Combustion: chemical reactions, calculations on air requirement for combustion.</p> | 8 |
| 5 | <p>Corrosion and Corrosion control</p> <p>a) Corrosion: introduction, types of corrosion, mechanism of atmospheric corrosion and wet corrosion. Galvanic series. Factors affecting corrosion: nature of metal and nature of environment. Different types of corrosion: Pitting corrosion, concentration cell corrosion, stress corrosion and soil corrosion.</p> <p>b) Corrosion control: methods of prevention of corrosion - cathodic and anodic protection, metallic coatings and its types - anodic and cathodic coatings. Method to apply metallic coatings - hot dipping, cladding, electroplating and cementation.</p> | 6 |

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| 6 | <p>Chemistry of Polymers and Novel Carbon Compounds</p> <p>a) Polymers: definition, classification of polymers on the basis of thermal behaviour, properties of polymers: degree of polymerization, crystallinity, Tg & Tm and factors affecting Tg. Polymerization and its types. Advanced polymeric materials: Structure, properties and applications of liquid crystal polymer – Kevlar, conducting polymers - Polyacetylene, electroluminescent polymer – PPV and biodegradable polymers – PHBV.</p> <p>b) Nanomaterials: definition, types of nanomaterials and properties of nanomaterials. Quantum dots: Types, properties and applications of QDs. Structure properties and applications of Graphene and Carbon Nano Tubes (CNTs).</p> | 7 |
| Total | | 45 |
| <p>Text Books:</p> <ol style="list-style-type: none"> 1) Engineering Chemistry by S.S. Dara, S.Chand Publications (2010). 2) Engineering Chemistry by B.S. Chauhan, UnivScPress.(2015). 3) A Text Book Of Engineering Chemistry by ShashiChawla, DhanpatRai& Co. (2015). 4) Spectroscopy of Organic Compounds by P. S. Kalsi, New Age International (2007). 5) Nanotechnology: principles and practices by S.K. Kulkarni, Springer (2014). 6) Instrumental methods of Chemical Analysis by GurdeepChatwal, Himalaya publishing house (1996). 7) Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Co.(2016). 8) Engineering Chemistry by Wiley India (2012). 9) Engineering Chemistry by O.G. Palanna, McGraw-Hill Education. 10) Introduction to Nanoscience and Nanotechnology by K. K. Chattopadhyay, A. N. Banerjee. PHI Learning (2009). | | |
| <p>Reference Books:</p> <ol style="list-style-type: none"> 1) Hydrogen as a fuel by Ram D. Gupta, C.R.C.Publication (2009). 2) Instrumental Methods of Analysis by H. H. Willard, L. L. Merritt, J. A. Dean, F. A. Settle, 6 th Edition, CBS Publisher. 3) Organic Spectroscopy by William Kemp, 3 rd edition, , John Wiley and Sons, Palgrave publication. 4) Polymer Science by V.R.Gowariker,, New Age International Publication (2015). 5) Nanotechnology by T. Gregory, Springer Verlog New York (1999). 6) Introduction to Nanotechnology by Charles P. Poole, Frank Owens, John Wiley & Sons (2003) 7) Engineering Chemistry by Wiley India Pvt.Ltd,First edition 2011. | | |

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|--|--|-----------------|---------------|--------------------------|------------------|-------------|--------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: I | | | |
| Course: Engineering Chemistry Laboratory | | | | Code: BSH21A05 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | Practical | Oral | Total |
| - | 2 | - | 1 | 50 | - | - | 50 |
| Prior Knowledge: Nil | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <ol style="list-style-type: none"> 1) To help students to procure conceptual clarity of Engineering Chemistry through laboratory experiments. 2) To develop experimental skills to acquire insight into societal and environmental issues. | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to:</p> <ol style="list-style-type: none"> 1) Analyze the quality of water for its hardness and alkalinity. 2) Apply various instrumental methods like pH-metry, conductometry, spectroscopy and electrochemical techniques for quantitative and qualitative chemical analysis. 3) Demonstrate the skill for determination of quality of coal by proximate analysis and synthesis of engineering materials. 4) Learn the chromatographic technique for separation of mixture of compounds. 5) Explore mini projects which are relevant to societal and environmental issues to develop research attitude. | | | | | | | |
| <p>Note: First five experiments are mandatory. A student has to perform either next five experiments or mini project in lieu of experiments.</p> | | | | | | | |
| Sr. No. | I) List of Experiments | | | | | | |
| 1 | Determination of total hardness (by EDTA method) and alkalinity of given water sample. | | | | | | |
| 2 | To determine the dissociation constant of a weak acid (acetic acid) using pH meter. | | | | | | |
| 3 | Titration of mixture of strong acid with strong base using Conductivity meter and determine | | | | | | |
| 4 | To determine the maximum wavelength of absorption of KMnO_4 , verify Beer's law and find concentration of the unknown sample. | | | | | | |
| 5 | Structural elucidation of unknown compounds by applying principles of UV and IR spectroscopy. | | | | | | |
| 6 | Proximate analysis of Coal. | | | | | | |
| 7 | To determine the electrochemical equivalent (ECE) of Cu. formaldehyde resin. | | | | | | |
| 8 | To prepare the Phenol | | | | | | |
| 9 | Preparation of biodiesel. | | | | | | |
| 10 | Chromatographic separation of ortho- and para nitro-phenol | | | | | | |
| Sr. No. | II) Topics for Mini project (Student has to choose one of the topics from list given below but not limiting to) | | | | | | |
| 1 | Synthesis of nano-materials. | | | | | | |
| 2 | Determination of active ingredients from medicines / concentration of dyes in commercial beverages using UV-Spectrophotometer. | | | | | | |
| 3 | Water audit of water samples | | | | | | |
| 4 | One-pot synthesis of biologically active compounds. | | | | | | |
| 5 | Microwave assisted chemical reactions. | | | | | | |
| 6 | Study of corrosion of metals in a medium of different atmospheric conditions | | | | | | |
| 7 | Soil analysis of agricultural soil samples. | | | | | | |
| Laboratory manual: | | | | | | | |
| 1. Vogel's Text book of Qualitative Chemical Analysis by J.Mendham, R.C,Denny, J.D.Barnes, M.J.K.Thomas, 6 e, Pearson Education Ltd. | | | | | | | |
| 2. Applied Chemistry Theory and Practice by O.P.Virmani and A.K.Narula, 2e, New age International (P) Ltd | | | | | | | |

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|--|--|-----------------|---------------|--------------------------|------------|-----------------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | | | Semester: I | |
| Course: Computer Programming and Problem Solving | | | | | | Code: BCE21B01 | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 3 | - | - | 3 | 20 | 30 | 50 | 100 |
| Prior Knowledge: - Nil | | | | | | | |
| Course Objectives: This course aims at enabling students, 1. To acquaint with the fundamental principles, concepts of problem solving. 2. To acquaint with the fundamental of Algorithms. 3. To build the programming logic using Factoring methods. 4. To acquaint with data structures and their terminology. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: 1. Explore the concepts and various possibilities for Problem Solving 2. Illustrate the fundamentals of algorithms. 3. Apply the factoring methods for solving problem 4. Use the array techniques for Problem solving 5. Apply the searching and sorting techniques for problem solving. 6. Apply the appropriate data structure to perform different operation. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Introduction to Problem Solving aspect, top-down design, Algorithm, Flowcharts/Pseudo codes, Sequential Approach, the compilation process, Syntax and Semantic errors, Variables and Data Types, Conditional Approach, Iterative Approach. Real life problem solving –Water Tank Leakage, Yellow page search, | | | | | | 6 |
| 2 | Fundamentals of Algorithms Exchanging values of two Variables with and without temporary variable, Counting, Summation of a set of numbers. Sine Function Computation, Factorial Computation, Power Computation, Fibonacci Sequence Generation, Reversing the digits of a number, Base Conversion, Character to number conversion. | | | | | | 8 |
| 3 | Factoring Methods Finding Square root of a number, Smallest Divisor of an integer, Finding GCD, LCM, Generating Prime numbers, Computing the prime factor of a number. Generation of pseudo-random numbers, Computing n-th Fibonacci number | | | | | | 8 |
| 4 | Array Techniques Array order reversal, Histogramming, Finding maximum number in a set, Removal of Duplicates from an ordered array, Union of two sets | | | | | | 7 |
| 5 | Searching and Sorting Techniques Searching Techniques: Linear search, Binary search Sorting Techniques: Types of sorting – Sorting by selection, Sorting by Exchange, Sorting by Insertion | | | | | | 9 |
| 6 | Introduction to Data Structures Introduction, Stack operation, Queue operations, Applications of Stack, Applications of Queue | | | | | | 7 |
| Total | | | | | | 45 | |

Text Books:

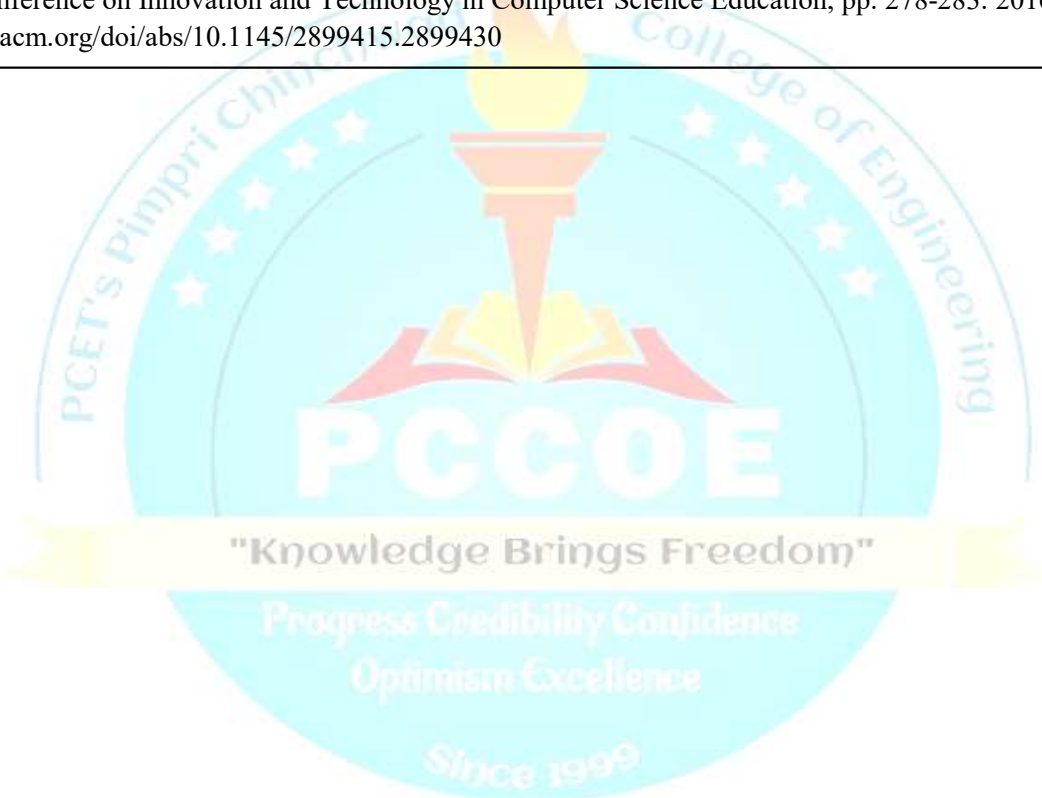
1. R.G.Dromey, "HowtoSolveitbyComputer", 1stEdition, Prentice-HallInternational, 1982.]
2. Maureen Sprankle, "Problem Solving and Programming Concepts" ,7th Edition, Prentice Hall, 1989.

Reference Books:

1. Ferreira Filho, Wladston. Computer science distilled: learn the art of solving computational problems. Code Energy, 2017.
2. Davidson, Janet E., and Robert J. Sternberg, eds. The psychology of problem solving. Cambridge university press, 2003.

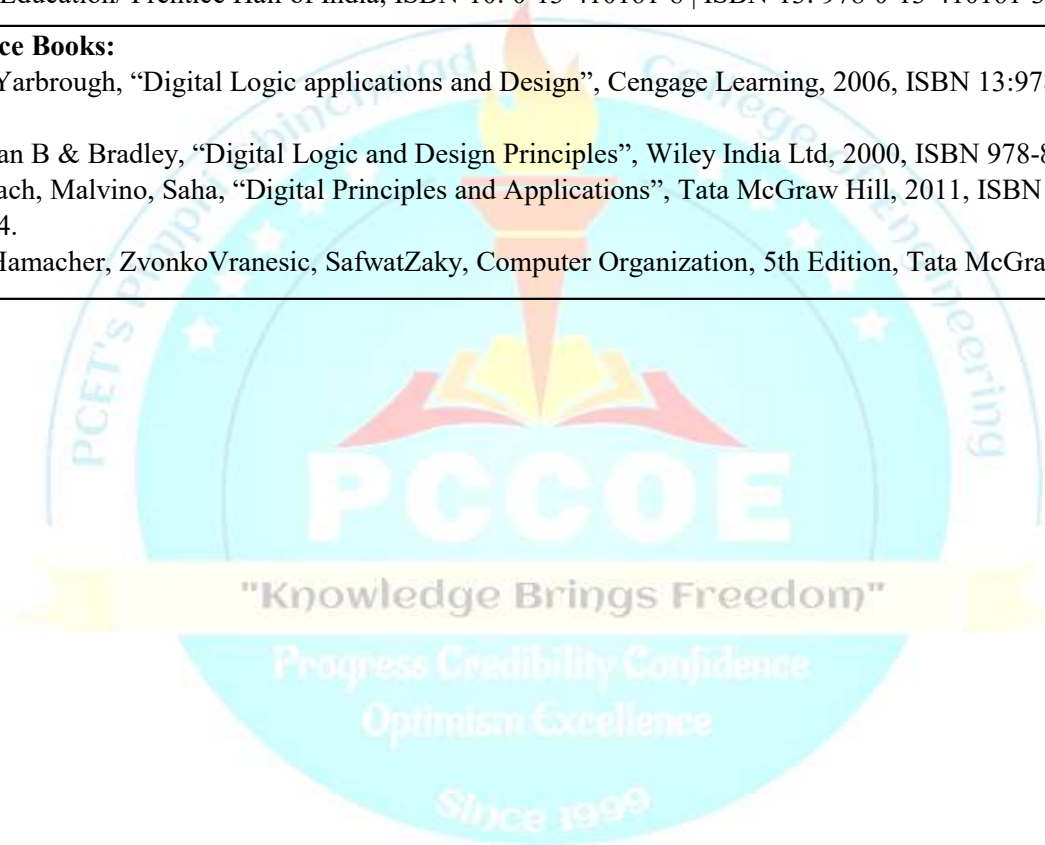
E Sources:

1. <https://www.eolymp.com/en/problems/3>
2. Ranade, Abhiram G. "Introductory programming: Let us cut through the clutter!." In Proceedings of the 2016 ACM Conference on Innovation and Technology in Computer Science Education, pp. 278-283. 2016. - <https://dl.acm.org/doi/abs/10.1145/2899415.2899430>



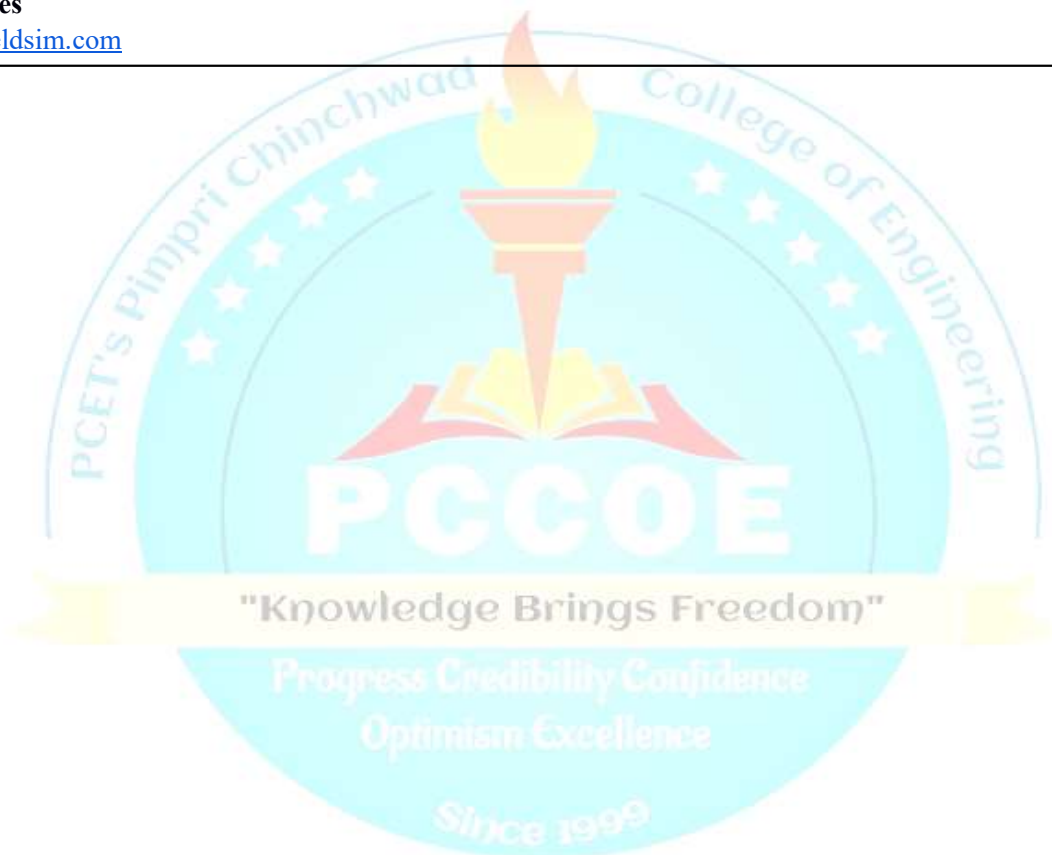
| | | | | | | | |
|---|--|-----------------|---------------|--------------------------|------------|-----------------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | | | Semester: I | |
| Course: Digital Electronics & Computer Organization | | | | | | Code: BCE21B02 | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 3 | - | - | 3 | 20 | 30 | 50 | 100 |
| Prior Knowledge: Basic concepts of Number System | | | | | | | |
| Course Objectives: This course aims at enabling students, <ol style="list-style-type: none"> 1. To get acquainted with the fundamental concept's Digital Electronics circuit design. 2. To develop skills for the design and implementation of combinational logic circuits. 3. To develop skills for the design and implementation of sequential logic circuits. 4. To get acquainted with the basic concept of computer organization. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: <ol style="list-style-type: none"> 1. Interpret Boolean expressions for designing digital circuits using K-Maps. 2. Design Combinational digital circuits as per the specifications. 3. Design Sequential digital circuits as per the specifications. 4. Compare Synchronous and asynchronous sequential circuits for Counters. 5. Demonstrate the basic concepts of computer organization. 6. Summarize input output and memory subsystem concepts. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Digital System and Binary Numbers Number System and Logic Gates. Logic minimization: Representation of truth-table, SOP form, POS form, Simplification of logical functions, Minimization of SOP and POS forms, don't care conditions Reduction techniques: K-Maps up to 4 variables. | | | | | | 8 |
| 2 | Design of Combinational Logic Code converter - BCD, Excess-3, Gray code, Binary Code. Half- Adder, Full Adder, Half Subtractor, Full Subtractor, Multiplexers (MUX), Demultiplexers (DEMUX), Parity generators. | | | | | | 8 |
| 3 | Design of Sequential Logic Storage elements: Latches and Flip-Flops, Flip-Flop: SR, J-K, D, T; Preset & Clear, Truth Tables and Excitation tables, Conversion from one type to another type of Flop- Flop. Registers: SISO, SIPO, PISO, PIPO. | | | | | | 8 |
| 4 | Synchronous and Asynchronous Circuits Counters: Asynchronous Counter, Synchronous Counter, BCD Counter, Johnson and Ring Counter, Modulus of the counter (IC 7490). | | | | | | 8 |
| 5 | Introduction to Computer Organization Introduction: Function and structure of a computer Functional components, interconnection of components, Bus Structures. Introduction to Processing Unit: Organization of a processor - Registers, ALU and Control unit, Instruction cycle. | | | | | | 7 |

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|--|---|-----------|
| 6 | Introduction to Input/Output Subsystem Access of I/O devices, I/O ports, I/O interfaces - Serial port, Parallel port, PCI bus, USB bus, I/O peripherals - Input devices, Output devices, Secondary storage devices. Introduction to Memory Subsystem: Memory Hierarchy, RAM(Random Access Memory), Read Only Memory (ROM), Types of ROM, Cache Memory. | 6 |
| Total | | 45 |
| Text Books: 1) 1. R.P.Jain, “Modern Digital Electronics”, Tata McGraw-Hill, 4th Edition,2010 ISBN 978-0-07-06691-16, 2. Moris Mano, “Digital Logic and Computer Design”, 2017, Pearson, ISBN 978-93-325-4252-5. 3. W. Stallings, “Computer Organization & Architecture: Designing for performance”, 10th Edition, 2016, Pearson Education/ Prentice Hall of India, ISBN-10: 0-13-410161-8 ISBN-13: 978-0-13-410161-3. | | |
| Reference Books: 1. John Yarbrough, “Digital Logic applications and Design”, Cengage Learning, 2006, ISBN 13:978-81-315-0058-3. 2. Norman B & Bradley, “Digital Logic and Design Principles”, Wiley India Ltd, 2000, ISBN 978-81-265-1258-4. 3. D. Leach, Malvino, Saha, “Digital Principles and Applications”, Tata McGraw Hill, 2011, ISBN 13:978-0- 07-014170-4. 4. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, Tata McGraw Hill, 2002. | | |



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|---|--|-----------------|---------------|--------------------------|-----------------------|-------------|--------------|
| Program: B. Tech. (Computer Engineering) | | | | | Semester: I | | |
| Course: Digital Electronics Laboratory | | | | | Code: BCE21B03 | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | Practical | Oral | Total |
| | 2 | | 1 | 50 | | | 50 |
| Prior Knowledge: - Nil | | | | | | | |
| Course Objectives: This course aims at enabling students, 1. To get acquainted with the fundamental concepts of Digital Electronics circuit design. 2. To develop skills for the design and implementation of combinational logic circuits. 3. To develop skills for the design and implementation of sequential logic circuits. 4. To get acquainted with the concept of design of counters in sequential logic circuits. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: 1. Interpret Boolean expressions to design digital circuits using K-Maps. 2. Design combinational digital circuits as per the specifications. 3. Design sequential digital circuits as per the specifications. 4. Compare synchronous and asynchronous counters to design digital circuits. | | | | | | | |
| Guidelines for Students: 1. The laboratory assignments are to be submitted by students in the form of a journal. 2. Journal consists of prologue, certificate, table of contents and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Software & Hardware requirements, Date of Completion, Assessment grade/marks and assessor's sign, Theory- Concept, circuit diagram, pin configuration, conclusion/analysis). | | | | | | | |
| Guidelines for Laboratory/Term Work Assessment: 1. Continuous assessment of laboratory work is done based on overall performance and Laboratory performance of students. 2. Each Laboratory assignment assessment should assign grade/marks based on parameters with appropriate weightage. 3. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include timely completion, performance, innovation, efficiency, punctuality and neatness. | | | | | | | |
| Guidelines for Laboratory Conduction 1. Each student must perform at least 4 assignments from group A and 3 assignments from group B and study assignment is compulsory. 2. Assignments are mandatory to perform on either on digital trainer kit or online simulator. 3. Students are expected to work in group of 3 to 4. | | | | | | | |
| Suggested List of Assignments | | | | | | | |
| Assignment No. | Assignment title | | | | | | |
| Group A - Assignments based on Combinational Logic Design | | | | | | | |
| 1 | Design & Implement Basic gates and Universal logic gates.(AND,OR,NOT,NAND,NOR). | | | | | | |
| 2 | Design & Implement Fulladder using Basic Gates. | | | | | | |
| 3 | Design & Implement Full subtractor using Basic Gates. | | | | | | |
| 4 | Design and Implement Code Converters-Binary to Gray. | | | | | | |
| 5 | Design & Realization of Boolean Expression for suitable combinational logic using MUX 74151. | | | | | | |
| 6 | Design & Implement Parity Generator using EX-OR. | | | | | | |
| Group B- Assignments based on Sequential Logic Design | | | | | | | |
| 7 | Design and Realization of Flip Flop Conversion. | | | | | | |
| 8 | Design of 3-bit Up Counter using suitable Flip Flops. | | | | | | |
| 9 | Design of 3-bit Down Counter using suitable Flip Flops | | | | | | |
| 10 | Design & Realization of Mod -N counter using IC 7490. | | | | | | |

| Group C: Study Assignment | |
|---|---|
| 11 | Assembling and disassembling of computer systems and Identifying Internal Components such as motherboard, RAM, SMPS, Ports, I/O Peripherals and Processoretc. |
| Reference Books: 1) John Yarbrough, —Digital Logic applications and Designl, Cengage Learning, ISBN – 13:978-81-315-0058-3, 2006. 2) Norman B & Bradley, —Digital Logic Design Principles, Wiley India Ltd, ISBN:978-81-265-1258-4, 2000. 3) D. Leach, Malvino, Saha, —Digital Principles and Applicationsl, Tata McGraw Hill, ISBN – 13:978-0- 07-014170-4,2011. | |
| E Sources www.Deldsim.com | |



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|--|---|-----------------|---------------|--------------------------|------------------|-----------------------|--------------|
| Program: B. Tech. (Computer Engineering) | | | | | | Semester: I | |
| Course: Computer Programming & Problem Solving Laboratory 1 | | | | | | Code: BCE21G01 | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | Practical | Oral | Total |
| - | 4 | - | 2 | 100 | - | - | 100 |
| Prior Knowledge: - Nil | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <ol style="list-style-type: none"> 1. To write the programming code by using various data types, variables, and operators. 2. To implement the decision and looping concepts in programs. 3. To get acquainted with the operations of Arrays. 4. To select appropriate searching and/or sorting techniques in the application development. 5. To implement the data structure in programs. | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Use data types, variables and operators for solving problems. 2. Illustrate the decision and looping statements in programming. 3. Implement the operations on Arrays. 4. Explore the various searching and sorting techniques for problem solving. 5. Apply the Stack and Queue data structure to perform the operations. | | | | | | | |
| <p>Guidelines for Students:</p> <ol style="list-style-type: none"> 1. The laboratory assignments are to be submitted by students in the form of a journal. 2. Journal consists of prologue, certificate, table of contents and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Date of Completion, Assessment grade/marks and assessor's sign, Theory- Concept, algorithm, sample input and expected output, conclusion). <p>Guidelines for Laboratory/Term Work Assessment:</p> <ol style="list-style-type: none"> 1. Continuous assessment of laboratory work is done based on overall performance and Laboratory performance of students. 2. Each Laboratory assignment assessment should assign grade/marks based on parameters with appropriate weightage. 3. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficiency, punctuality and neatness. <p>Guidelines for Laboratory Conduction</p> <ol style="list-style-type: none"> 1. Assignments on all concepts covered in Group A are mandatory. 2. Any two Assignments from Group B should be implemented, recommended on coding platforms such as Hacker Rank, CodeChef. 3. Encourage students for appropriate use of Hungarian notation, proper indentation and comments. 4. Use of open-source software is to be encouraged. 5. Operating System recommended: - 64-bit Open-source Linux or its derivative. 6. Programming tools recommended: -GCC, Turbo C/C++, Eclipse. | | | | | | | |
| Suggested List of Assignments | | | | | | | |
| Assignment No. | Assignment title | | | | | | |
| Group A | | | | | | | |
| 1 | Choose a real world problem that involves various types of data. Develop a program to solve this problem by effectively using appropriate variables and data types. | | | | | | |
| 2 | Write a program to generate Fibonacci series and Factorial of a given number. | | | | | | |

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| 3 | Write a program to find a) Prime number from given 'n' Numbers. b) GCD of given numbers. c) If given number is Palindrome. |
| 4 | Write a program to input marks of 5 courses (Physics, Chemistry, Math, English & Computer) for a student. Display the rank, total marks and percentage of each student in each course. The rank is categorized as fail (marks < 40%), pass & third division (marks between 40 to 55%), second (marks between 55 to 65%), first (marks between 65 to 80%), Distinction (marks between 80 to 95%), extra ordinary (marks above 95 to 100%). |
| 5 | Write a program to accept details of two matrices. Add and multiply given matrices and print the result. |
| 6 | Write a program for Linear search. Test your program on a variety of arrays of different sizes and types. |
| 7 | Write a program for Binary search for given 'n' numbers. The program should handle sorted arrays of different sizes and types. |
| 8 | Write a program for implementing Selection sort for given 'n' numbers |
| 9 | Choose a real world problem for using Stack and Queue concepts. Write a program to implement this problem using stack and queue. |
| 10 | Write a program to store student information (e.g. Roll No, Name, Percentage etc.). a) Display the data in descending order of Percentage (Insertion Sort). b) Display data for roll no specified by user (Linear Search). |
| Group B | |
| 11 | An online bookstore is facing challenges in managing its large inventory of books. The inventory contains thousands of book titles across various genres and authors. To improve the user experience and optimize book discovery, the bookstore needs an efficient sorting algorithm to organize books systematically on their website. (Sorting by Title, Sorting by Author, Sorting by Genre, Sorting by Release Date) |
| 12 | Implement a stack-based system to manage the checkout process for online shopping cart of an e-commerce platform. The system should be able to handle the following scenarios: <ul style="list-style-type: none"> ● Adding Items to the Cart: When a customer selects an item to purchase, it should be added to their shopping cart. ● Removing Items from the Cart: If a customer decides to remove an item from their cart, the system should remove the item from the top of the stack. ● Checking the Top Item: The system should provide a way to check the top item in the shopping cart without removing it from the stack. If the cart is empty, the system should indicate that the cart is empty. ● Completing the Checkout Process: Once a customer completes their shopping and proceeds to checkout, the system should process the items in the cart. |

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| 13 | <p>An online bookstore is experiencing a surge in customer orders due to a special promotion. To efficiently handle the incoming orders and ensure smooth order processing, they have decided to implement a queue-based system.</p> <p>The system needs to handle the following scenarios:</p> <ul style="list-style-type: none"> ● Order Queuing: When a customer places an order, the order details (such as order ID, customer information, and ordered items) should be added to the order queue. ● Order Completion: Once an order has been successfully processed and shipped, it should be removed from the queue. ● Order Status and Updates: Customers should be able to check the status of their orders. <p>Implement a queue-based order processing system that efficiently handles the above scenarios to ensure timely and accurate order fulfillment for the online bookstore.</p> |
| <p>Text Books:</p> <ol style="list-style-type: none"> 1. E. Balagurusamy, “Programming in ANSI C”, 8 th Edition, McGraw Hill,2019. 2. Brian W Kernighan, Dennis M Ritchie, “C Programming Language”, 2 nd Edition, Pearson, 1988. 3. Y. Langsam, M. Augenstein and A. Tannenbaum, “Data Structures using C”, Pearson Education Asia, First Edition,2002, ISBN 978-81-317-0229-1. 4. R.G.Dromey, “How to Solve it by Computer”,1stEdition,Prentice-HallInternational,1982. | |
| <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Maureen Sprankle, “Problem Solving and Programming Concepts” ,7th Edition, Prentice Hall, 1989. 2. YashavantKanetkar, “Let Us C”, 16th edition, BPB publications,2018 3. G.A.V. PAI, “Data Structures and Algorithms, Concepts, Techniques and Applications”, Tata McGraw-Hill, Volume1 1st Edition, 2017. ISBN-10: 0070667268/ ISBN-13: 978-0070667266. | |

| Program: B. Tech. (Computer Engineering) | | | | Semester: I | | | |
|---|---|----------|--------|-------------------|-----|-----------|----------------|
| Course: HSMC-English | | | | Code: BSH21H01 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 1 | 2 | - | 2 | 30 | - | 20 | 50 |
| Prior knowledge: 1. Basic Knowledge of English grammar. 2. Basic Vocabulary, Listening and Speaking Skills | | | | | | | |
| Course Objectives: This course aims at enabling students, 1. To develop basic LSRW skills for effective communication. 2. To develop a sense of confidence among students to present themselves at professional as well as societal level. 3. To enhance the language competence. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to 1. Understand the role of effective listening skills, grammar and vocabulary in effective communication. 2. Formulate grammatically correct sentences and Enrich their vocabulary 3. Demonstrate reading skills to comprehend various documents 4. Communicate effectively and enhance their phonetic skills. | | | | | | | |
| Unit | Description | | | | | | Duration |
| 1 | Listening Skills: Importance of Listening Skills, Listening and Hearing, Types of Listening: Active / Selective / Passive Listening, Barriers to Listening, Tips to Improve Listening Skills Grammar & Vocabulary: Common Errors in Daily Discourse, Compound and Complex Sentences, Modal Auxiliaries. Processes of Word Formation, One Word Substitutions, Words often Confused, Usage of Business Phrases & Idioms. | | | | | | 3 |
| 2 | Writing Skills : Elements of Effective Writing, Writing Styles (Formal & Informal), Paragraph Writing (Descriptive, Technical) Professional Writing: Job Application, Leave Application, Enquiry and Complaint Letter. Features of Technical Writing, Report Writing; Progress, Accident Report, Event Report. | | | | | | 4 |
| 3 | Reading Skills: Importance of Reading, Scanning, Skimming, Reading between the Lines, Reading Comprehension: Factual / Expository / Informative texts, Case Studies, Reading Research Articles Literary Reading: 1 The Story of An Hour by Kate Chopin, 2 The Classical Student by Anton Chekhov 3 A Chameleon by Anton Chekhov. | | | | | | 4 |
| 4 | Speaking Skills: Basic Sounds-IPA, Word Stress, Intonation, Language Functions (Requesting, Apologizing, Complaining, Complementing, Thanking, etc) Art of Asking and Responding to Questions Public Speaking: Importance of Public Speaking, Art of Extempore& Presentations, Role Play, Delivering Welcome Speech, Vote of Thanks, Group Discussion. | | | | | | 4 |
| Total | | | | | | 15 | |
| Practical/Lab Sessions | | | | | | | |
| Lab Session | Activities | | | | | | Duration (Hrs) |
| 1 | Listening 1: Listen to the audio and answer the questions (IELTS) | | | | | | 2 |
| 2 | Listening 2 : Listen to the audio and Summarize (Ted Talks) | | | | | | 2 |
| 3 | Grammar: Correct the sentences and understand the business usages. | | | | | | 2 |
| 4 | Vocabulary: Different ways to improve vocabulary and activities | | | | | | 2 |

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| 5 | Writing Skills 1: Formal writing such as Job Application, Leave Application, Enquiry and Complaint Letter. | 2 |
| 6 | Writing Skills 2: Different Styles of writing and Paragraph Writing (Descriptive, Technical) | 2 |
| | Writing Skills 3: Technical Writing, Report Writing; Progress, Accident Report, Event Report. | 2 |
| 8 | Reading Activity 1: Communication Case Studies | 2 |
| 9 | Reading Activity 2: IELTS based Comprehension Skills | 2 |
| 10 | Reading Activity 3: Research Articles and Technical Documents | 2 |
| 11 | Reading Activity 4: Literary Reading and Discussion | 2 |
| 12 | Speaking Activity 1: IPA Pronunciation and Phonetics Exercises | 2 |
| 13 | Speaking Activity 2: Delivering speeches and Mastering the Art of Public Speaking | 2 |
| 14 | Speaking Activity 3: Preparing and Participating Group Discussions / Elevator Speeches | 2 |
| 15 | Speaking Activity 4: Oral/PPT Presentation with Q&A Session | 2 |
| Total | | 30 |
| Text Books: Raymond Murphy, Essential English Grammar in Use, Cambridge University Press; 2015 | | |
| Reference Books: | | |
| 1. Michael Swan, Practical English Usage, Oxford, 3rd Edition; 2005 | | |
| 2. David F. Beer, Writing and Speaking in the Technology Professions: A Practical Guide, Wiley-IEEE Press; 2nd Edition, 2003 | | |
| 3. Sunita Mishra, C. Muralikrishna, Communication Skills for Engineers, Pearson Education; 2011 | | |
| 4. Clifford Whitcomb, Leslie E. Whitcomb, Effective Interpersonal and Team Communication Skills for Engineers, Wiley-Blackwell; Nil edition, 2013. | | |
| 5. Krishnaswami, N and Sriraman, T, Creative English for Communication, Macmillan. | | |
| Saran Freeman, Written Communication in English, Orient Longman. | | |
| E Sources - | | |
| 1. https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs19/&sa=D&source=editors&ust=1654924489543365&usg=AOvVaw0vWIA1-FXdmtGD4TbPCXo- | | |
| 2. https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs22/&sa=D&source=editors&ust=1654924489545718&usg=AOvVaw1JiV6Z4RihjTKbm8Sd2HDC | | |
| 3. https://takeielts.britishcouncil.org/take-ielts/prepare/free-ielts-practice-tests/listening/section-1 | | |

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|--|---|-----------------|---------------|--------------------------|------------|------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: I | | | |
| Course: HSMC-German | | | | Code: BSH21H02 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 1 | 2 | - | 2 | 30 | - | 20 | 50 |
| Prior Knowledge: English Language | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <ol style="list-style-type: none"> 1. To get familiar with the basics of German language and develop their interest in the language. 2. To get equipped with basic language skills, namely listening, speaking, reading, and writing for the purpose of socializing, providing and obtaining information. 3. To develop inter cultural competence and understanding of perceptions, gestures, family, and community dynamics. | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to,</p> <ol style="list-style-type: none"> 1. Demonstrate understanding of simple texts in German 2. Apply grammar rules to frame correct sentences in German 3. Communicate in a simple manner in German 4. Construct simple texts in German | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | <p>Building Vocabulary, Developing Listening and Reading Skills</p> <ul style="list-style-type: none"> ● Self-introduction, things of day-to-day use, Hobbies & Free time, Food & Beverages, Clock time & Daily Routine, Living & Working in Germany, Weather and Healthcare ● Listen and understand short conversations, announcements, voice mail in German ● Read and comprehend from instruction boards, advertisements, simple texts, short messages, letters and emails in German B64:B67 | | | | | | 3 |
| 2 | <p>German Grammar and Sentence Structure</p> <ul style="list-style-type: none"> ● Personal Pronouns: Singular and Plural ● Verbs and Verb-Conjugation: regular, irregular, mixed, separable, modal auxiliaries ● Types of Articles: definite, indefinite, negative, possessive ● Cases: nominative, accusative, dative ● Types of the sentences: declarative, interrogative, imperative ● Basic German conjunctions: and, or, but, because | | | | | | 4 |
| 3 | <p>Speaking Skills</p> <ul style="list-style-type: none"> ● Spelling and pronunciation ● Asking for and giving simple information ● Requesting and responding to requests ● Learning simple German dialogues and speaking with expression ● Role play: Presenting a simple dialogue on given situation | | | | | | 4 |

| 4 | Writing Skills <ul style="list-style-type: none"> ● Building words and simple sentences ● Filling up personal information in very simple forms (e.g. name, address, etc) ● Using punctuation marks correctly in given texts ● Correcting errors in given draft ● Writing simple texts, short messages, letters and emails on given topics | 4 |
|---|---|----------------|
| Total | | 15 |
| Practical/Lab Sessions | | |
| Lab Session | Activities | Duration (Hrs) |
| 1 | Vocabulary 1: Exercises to recall and enhance vocabulary | 2 |
| 2 | Listening 1: Listen to the audio and repeat (phonetics) | 2 |
| 3 | Listening 2: Listen to the audio and select the correct option (A1 practice) | 2 |
| 4 | Vocabulary 2: Exercises to recall and enhance vocabulary | 2 |
| 5 | Reading 1: Read short texts and fill up the information in table | 2 |
| 6 | Reading 2: Read short texts and mark true or false (A1 practice) | 2 |
| 7 | Reading 3: Read short texts and answer the questions | 2 |
| 8 | Grammar 1: Solve simple grammar exercises | 2 |
| 9 | Grammar 2: Construct correct sentences by applying grammar rules | 2 |
| 10 | Speaking 1: Spell and pronounce the words correctly (A1 practice) | 2 |
| 11 | Speaking 2: Give your short introduction (A1 practice) | 2 |
| 12 | Speaking 3: Frame simple questions, requests and reply (A1 practice) | 2 |
| 13 | Writing 1: Fill up simple data in forms (A1 practice) | 2 |
| 14 | Writing 2: Correct errors in given draft | 2 |
| 15 | Writing 3: Write simple texts, short messages, emails and letters (A1 practice) | 2 |
| Total | | 30 |
| Text Books: | | |
| Netzwerk A1: Dengler, Rusch, Schmitz, Sieber, Ernst Klett Sprachen, Stuttgart Germany, Goyal Publishers & Distributors, Delhi, 2015 | | |
| Reference Books: | | |
| 1) Linie 1: Kaufmann, Moritz, Rodi, Rohrmann, Sonntag, Klett-Langenscheidt GmbH, München Germany, Goyal Publishers & Distributors, Delhi, 2018 | | |
| 2) Tangram aktuell 1: Dallapiazza, Eduard von Jan, Schönherr, Max Hueber Verlag, Ismaning, Germany, Goyal Publishers & Distributors, Delhi, 2005 | | |
| E-sources: | | |
| 1) NPTEL Course lectures (IIT Madras) link: https://onlinecourses.nptel.ac.in/noc23_hs98/preview | | |
| 2) Udeemy Course lectures link: https://www.udemy.com/topic/german-language/free/ | | |

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|--|---|-----------------|---------------|--------------------------|------------|------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: I | | | |
| Course: HSMC-Japanese | | | | Code: BSH21H03 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 1 | 2 | - | 2 | 30 | - | 20 | 50 |
| Prior Knowledge: English/Marathi/Hindi language for learning Japanese language. | | | | | | | |
| Course Objectives: This course aims at enabling students | | | | | | | |
| <ol style="list-style-type: none"> 1. To be aware of Japanese scripts (Hiragana, Katakana) and basic Kanjis. 2. To familiarize themselves with the Japanese language and use basic greetings in day-to-day life. 3. To develop language skills namely listening, speaking, reading and writing skills for socializing, providing and obtaining information. 4. To express themselves using basic sentences and develop cross cultural skills and understanding of gestures, family and community, perceptions. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to | | | | | | | |
| <ol style="list-style-type: none"> 1. Understand Japanese scripts through oral and written communication 2. Explore Japanese culture and etiquettes 3. Express themselves by using simple sentences and responses to questions 4. Develop language skills namely speaking, reading and writing skills for providing and obtaining information. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Introduction: Hiragana Script. <ul style="list-style-type: none"> ● Listening: Short video skit on self-introduction. ● Speaking: Song of greetings. ● Reading: Hiragana words ● Writing: Japanese scripts (Hiragana) ● Test on Hiragana | | | | | | 3 |
| 2 | Katakana script <ul style="list-style-type: none"> ● Listening: English words ● Speaking: Song on body parts. ● Reading: Katakana words ● Writing: Locating countries on map, Wordhunt. ● Grammar: Test on Katakana. | | | | | | 4 |
| 3 | わたしはマイク. ミラーです。 <ul style="list-style-type: none"> ● Speaking: Self-introduction ● Listening: Conversation based on L-1 ● Writing: Writing about yourself. ● Reading: Lesson reading no.-1 ● Grammar: Introduction to 1. particles (は、か、も、か) 2. Verb (です、ではありません) | | | | | | 4 |

| 4 | <p>これからお世話になります。</p> <ul style="list-style-type: none"> ● Speaking: Greetings. ● Listening: Conversation based on L-2 ● Writing: Numbers (0- 100) in Japanese. ● Reading: Lesson reading no.2 ● Grammar: (past, negative form), ● Introduction to 12, questioning words (なん、だれ、どなた). ● 2. この、その、あの、どの 3. Particle の ● Test on grammar | 4 |
|--|---|----------------|
| Total | | 15 |
| Practical/Lab Sessions | | |
| Lab Session | Activities | Duration (Hrs) |
| 1 | Speaking skill 1: Japanese greetings | 2 |
| 2 | Writing Skill 1: Hiragana script | 2 |
| 3 | Listening Skill 1: Writing 'Hiragana' words | 2 |
| 4 | Reading Skill 1: Reading and recognizing 'Hiragana' words | 2 |
| 5 | Writing Skill 2: World map activity | 2 |
| 6 | Reading Skill 2: Reading 'Katakana' words | 2 |
| 7 | Speaking Skill 2: Self introduction | 2 |
| 8 | Writing Skill 3: Basic sentence formation using grammar. | 2 |
| 9 | Reading Skill 3: Chapter-1 reading | 2 |
| 10 | Listening Skill 3: Conversation in the office. | 2 |
| 11 | Speaking Skill 3: Dialogues between people of different nationality. | 2 |
| 12 | Writing Skill 4: Writing Japanese numbers using 'Hiragana' and 'Kanjis'. | 2 |
| 13 | Reading Skill 4: Chapter-2 reading | 2 |
| 14 | Listening Skill 4: Listening to Days of the week and dates of the month | 2 |
| 15 | Speaking Skill 4: Daily routine using verbs. | 2 |
| Total | | 30 |
| Textbook: | | |
| 1. Minna no Nihongo Part I and II Publication: Goyal Publishers & Distributors Pvt. Ltd. , Author: Tsuruo Yoshiko (Compiled) , Edition: 2018 | | |
| 2. Nihongo Shoho Publication: JALTAP , Author: JALTAP (With permission of Japan Foundation, Tokyo), Edition: April 2008 | | |
| Reference Books: | | |
| 1. Genki 1 Author: Eri Banno, Yoko Sakane, Yutaka Ohno, Chikako Shinagawa, and Kyoko Tokashiki. Publication: The Japan Times. Edition: 2011 | | |
| 2. MOMO Author: Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007 | | |
| 3. MOMO Japanese work book Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007 | | |
| 4. MOMO Japanese workbook Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007 | | |

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|--|--|-----------------|---------------|--------------------------|------------|------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: I | | | |
| Course: HSMC-Business Storytelling | | | | Code: BSH21H04 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 1 | 2 | - | 2 | 30 | - | 20 | 50 |
| Prior Knowledge: Basic competence of English language. | | | | | | | |
| Course Objectives: This course aims at enabling students, 1. To understand storytelling as one of the tools of influential communication. 2. To strengthen their creativity, critical thinking and social skills. 3. To use stories to face leadership, management and professional challenges. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to 1. Identify nuances of storytelling method as an influential communication 2. Demonstrate the ability to engage and inspire others through the development of narratives, tone and style 3. Apply storytelling techniques to communicate effectively in a business context 4. Develop stories to build, maintain professional relationships, deliver messages and motivate others toward action. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Concept and Scope: What is a story? A Brief History & Importance of Storytelling, Basics of Storytelling - Entertainment, Engagement, Personalization, Critical Thinking, Observation Skills in Storytelling, Benefits of Storytelling, Storytelling in Engineering, Business Storytelling, Activity: Analysis of Steve Jobs Commencement Speech at Stanford (2005) | | | | | | 3 |
| 2 | Process of Storytelling: Elements of a Story - Context and Relevance, Style and Detailing, Plot, and Characters, The Flow of the Story - Relevance - Action - Result, Know the Purpose - Inspire Action, Educate People, Showcase Values, Build Collaboration, Know your Audience - Educational, Social Background and Age, Developing Narratives: Characteristics of a Narrative, Data Visualization, Presenting a Word Picture, Triggering Emotions of the Audience, Choosing Media - Audio, Written, Oral and Digital Storytelling Activity: Analysis of a Short Story: 'The Three Hermits by Leo Tolstoy', The Last Painting by O' Henry | | | | | | 4 |
| 3 | Types of Stories - Customer Story, Origin Story, Event Story, Product Stories, Storytelling Techniques for Presentations, Using Power Words Effectively, Using Narratives to Manage Conflicts, Using a Narrative to Interpret the Past and Shape the Future, Storytelling in Marketing, Story Strategies - Using Anchor Stories Case studies - Brand storytelling -Steve Jobs / Jack Maa - Product Presentation, Lido Anthony "Lee" Iacocca. | | | | | | 4 |

| 4 | Crafting a Story Crafting a Story from a Picture/an Idea/Situation/Artifacts, Storyline - Beginning / Motive / Struggle / Achievement, Six-word Story - Memoirs to Being with, Detailing of Character and the Context, Delivering a Story – Tone / Emotions / Voice Modulation Activity- Developing and Delivering Presentation through Storytelling on the Given Situation/Context | 4 |
|-------------------------------|---|-----------------------|
| Total | | 15 |
| Practical/Lab Sessions | | |
| Lab Session | Activities | Duration (Hrs) |
| 1 | Basic of Storytelling: Using Five Senses in storytelling activity and Elements of Storytelling | 2 |
| 2 | Analysis of a Short Story: ‘The Three Hermits by Leo Tolstoy’, and The Last Painting by O’ Henry. | 2 |
| 3 | Character Study: Create a detailed character profile of a fictional character, including their background, motivations, and personality traits. Write a short story or scene that showcases this character in action | 2 |
| 4 | Personal Storytelling: Write and present a short personal story that highlights a challenge you've faced and how you overcame it | 2 |
| 5 | Collaborative Storytelling: Partner with another student to create a collaborative story. Take turns writing alternating sections, focusing on maintaining a consistent tone and narrative flow. | 2 |
| 6 | Historical Business Story: Research and narrate a significant historical event or moment in a well-known business's journey, focusing on how storytelling played a role in shaping public perception | 2 |
| 7 | Social Impact Story: Develop a story that demonstrates how a business initiative or project positively impacted a community or addressed a social issue | 2 |
| 8 | Customer Success Story: Craft a narrative that showcases a customer's journey with your fictional business | 2 |
| 9 | Change Management Story: Design a narrative that communicates a change initiative within a company, addressing challenges, resistance, and the ultimate benefits of the change | 2 |
| 10 | Investor Pitch Story: Craft a persuasive story for a startup pitch. Highlight the problem, solution, market opportunity, and potential for growth in a captivating way | 2 |
| 11 | Leadership Story: Compose a story that illustrates effective leadership qualities and strategies. Highlight a leader's ability to motivate, inspire, and guide a team toward success | 2 |
| 12 | Cultural Storytelling: Explore how storytelling can bridge cultural gaps in a global business context. Share a story that demonstrates cultural sensitivity and understanding | 2 |

| | | |
|---|---|-----------|
| 13 | Ethical Dilemma Story: Present a complex ethical dilemma faced by a business or individual. Use storytelling to explore various perspectives and potential solutions | 2 |
| 14 | Marketing Campaign Story: Design a storytelling-based marketing campaign for a specific product or service launch, incorporating different media and channels | 2 |
| 15 | Crisis Turnaround Story: Narrate a scenario where a business successfully navigated a crisis through strategic communication and storytelling, ultimately regaining trust and reputation. | 2 |
| Total | | 30 |
| Text Books: 1. Kendall Haven, Story Smart, Libraries Unlimited, 2014 | | |
| Reference Books: | | |
| 1. Kendall Haven, Story Proof, Libraries Unlimited, 2007. | | |
| 2. Rob Biesenbach, Unleash the Power of Storytelling: Win Hearts, Change Minds, Get Results, Eastlawn Media, 2018. | | |
| 3. Yiannis Gabriel, Storytelling in Organizations: Facts, Fictions, and Fantasies, Oxford University Press, 2011. | | |
| E-resources: | | |
| 1. The Art of Business Storytelling AmeenHaque Talks at Google , https://www.youtube.com/watch?v=77FUr6ZsWjY | | |
| 2. Marketing Storytelling - https://www.referralcandy.com/blog/storytelling-examples/ | | |
| 3. 5 examples of great storytelling from Jack Ma https://www.youtube.com/watch?v=3nHOxONWfEs | | |
| 4. Six words story - Nicole Kahn https://www.youtube.com/watch?v=16sY1iLc2d4 | | |
| 5. Kevin Hart - Telling great stories https://www.youtube.com/watch?v=vn_L4OPU_rg | | |

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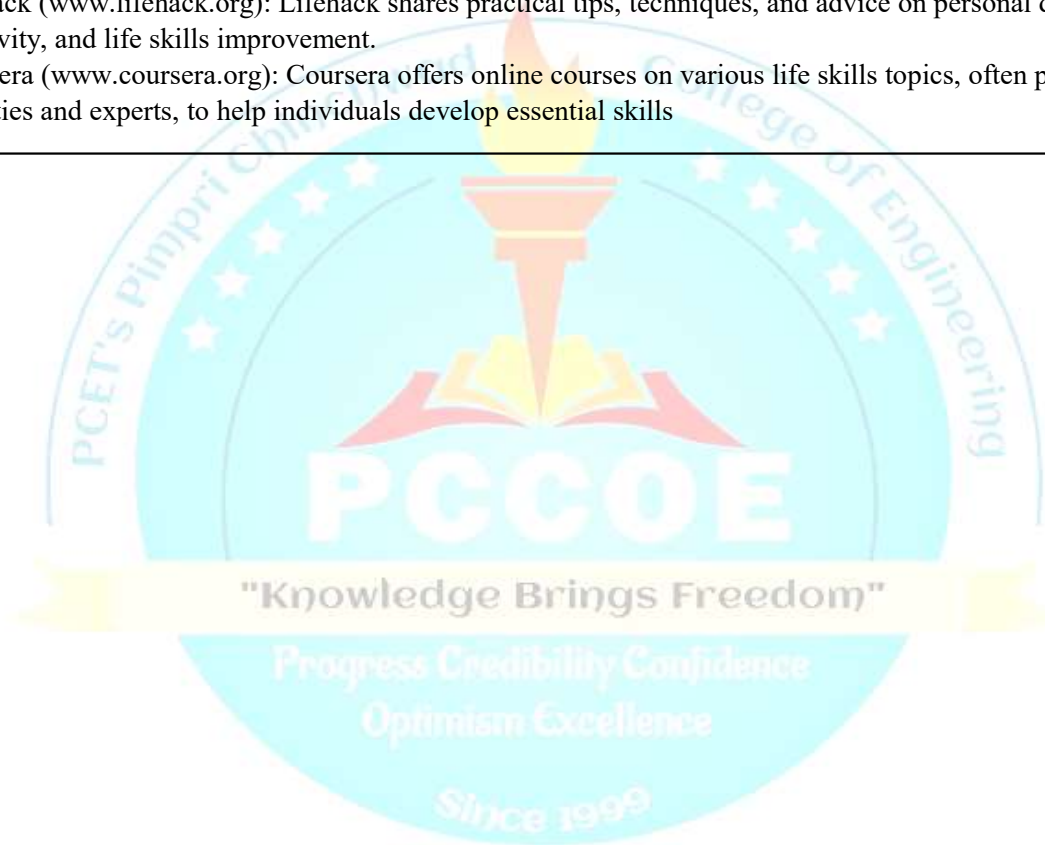
| | | | | | | | |
|--|---|-----------------|---------------|--------------------------|------------------|-----------------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | | | Semester: I | |
| Course: Life Skills 1 | | | | | | Code: BSH21K01 | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | Practical | Oral | Total |
| - | 4 | - | 2 | 100 | - | - | 100 |
| Prior Knowledge:- Nil | | | | | | | |
| Course Objectives: | | | | | | | |
| 1. To equip them with essential skills and knowledge that complement their academic education, preparing them to excel not only as engineers but also as well-balanced individuals | | | | | | | |
| 2. To develop students' vital life skills that promotes personal growth, resilience, and success in their academic journey and beyond | | | | | | | |
| Course Outcomes: Students will be able to | | | | | | | |
| 1. Understand the true essence of happiness by being harmony with oneself. | | | | | | | |
| 2. Explore skills to get along with others to create and maintain healthy relationships. | | | | | | | |
| 3. Apply different ways of rational thinking. | | | | | | | |
| 4. Develop emotional intelligence. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Happy You, Happy Life! (i) Healthy Mind - Music Therapy, Yoga, Meditation, Happiness and Success. (ii) Self-Awareness - Know your personality, Develop your Self- Esteem, Johari Window, SWOT, Setting goals for yourself (SMART). (iii) Healthy Lifestyle - Nutrition, Significance of Physical Activity in Daily routine. | | | | | | 15 |
| 2 | Building Relationships (i) People Skills - Networking, Developing Healthy Relationships, Collaboration, Reliability, Respectfulness, Open- Mindedness (ii) Effective Communication in Relationships-My Relationship Web, Relationship Recipe, Active Listening and Conflict Resolution (iii) Embracing Diversity: Respect for Different Perspectives and Cultures. | | | | | | 15 |
| 3 | The Reflective Engineer (i) Critical Thinking - Fact or Fiction, Convergent & Divergent Thinking (ii) Creative Thinking - Imagination, Formulate and Articulate Ideas (iii) Perspective Thinking – Understanding others view Points, Respecting Others Opinions (iv) Decision Making – Rational, Analytical & Ethical Solutions. | | | | | | 15 |
| 4 | You CAN DO IT... (i) Managing Stress - Good Stress , Bad Stress, Anxiety (ii) Managing time - Planning, Prioritization, Delegation, Productivity and Positivity (iii) Managing Emotions – Self- Regulation, Self-Motivation, Empathy, Assertiveness, Anger Management (iv) Handling Peer Pressure- Types of Peer Pressure: Spoken Peer Pressure, Unspoken Peer Pressure, Direct Peer Pressure, Indirect Peer Pressure, Positive Peer Pressure, Negative Peer Pressure. | | | | | | 15 |
| Total | | | | | | 60 | |

Reference Books

1. "The 7 Habits of Highly Effective Teens" by Sean Covey Publisher: Simon & Schuster, 2017
2. "How to Win Friends and Influence People" by Dale Carnegie Publisher: Simon & Schuster, 2020
3. "Emotional Intelligence: Why It Can Matter More Than IQ" by Daniel Goleman Publisher: Bantam Books, 2021
4. "Mindset: The New Psychology of Success" by Carol S. Dweck Publisher: Ballantine Books, 2019
5. "The Power of Habit: Why We Do What We Do in Life and Business" by Charles Duhigg Publisher: Random House, 2016

Weblinks

1. Psychology Today (www.psychologytoday.com): Psychology Today publishes articles and insights from psychologists and mental health experts that can be useful for improving life skills and emotional intelligence.
2. Lifehack (www.lifehack.org): Lifehack shares practical tips, techniques, and advice on personal development, productivity, and life skills improvement.
3. Coursera (www.coursera.org): Coursera offers online courses on various life skills topics, often provided by universities and experts, to help individuals develop essential skills



Curriculum Structure

First Year B.Tech

Computer Engineering

Semester II

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| Program: B. Tech. (Computer Engineering) | | | | | | Semester: II | |
|---|---|-----------|--------|-------------------|-----|----------------|-----------------|
| Course: Multivariate Calculus | | | | | | Code: BSH22A06 | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial* | Credit | IE | MTE | ETE | Total |
| 2 | - | 1 | 2 | 20 | 30 | 50 | 100 |
| Prior Knowledge: 1) Elementary Mathematics 2) Elementary Calculus | | | | | | | |
| Course Objectives: This course aims at enabling students, 1) To strengthen the concepts of multivariable calculus and its application in maxima & minima, error & approximation area, volume 2) To make students acquainted with advanced techniques to evaluate integrals. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: 1) Evaluate Partial Differentiation and apply the concept of partial differentiation to find Maxima & Minima and Error & Approximation. 2) Solve for First order and first degree partial differential equations. 3) Understand definite improper integrals like Gamma, Beta function, DUIS. 4) Apply multiple integration techniques to analyze Area, Volume. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Partial Differentiation: Partial derivatives, Composite function, Chain Rule, variable to be treated as constant, total derivatives. Euler's theorem for homogeneous functions. Application of Partial derivatives: Jacobian for explicit function, Errors and Approximations, Maxima and Minima of two variable functions. | | | | | | 8 |
| 2 | Partial Differential Equation(PDE): Definition of PDE, order and degree of PDE, Formation of PDE, Classification of PDE, Initial and Boundary value problems, Solution of First order Partial differential equations. | | | | | | 7 |
| 3 | Integral Calculus: Beta and Gamma functions, differentiation under integral sign (DUIS). | | | | | | 7 |
| 4 | Multiple Integral: Double integration, conversion into polar form, application of double integration to the area, Triple integration, Dirichlet's theorem, application of triple integration to Volume. | | | | | | 8 |
| Total | | | | | | 30 | |
| * Tutorial will be conducted in batches as 1Hr/week/batch | | | | | | | |
| Sr. No. | List of Tutorials | | | | | | |
| 1 | Partial derivatives basic rules, Mixed partial derivatives & properties ; | | | | | | |
| 2 | Euler's theorem on Homogeneous Functions and deductions; | | | | | | |
| 3 | Examples on variables to be treated as constant, Composite functions; | | | | | | |
| 4 | Definition of Jacobian, Jacobian of explicit functions; | | | | | | |
| 5 | Errors & Approximations, problem solving; | | | | | | |
| 6 | Maxima and minima of functions of two variables; | | | | | | |
| 7 | Partial differential equation formation, classification, | | | | | | |
| 8 | Solution of first order first degree | | | | | | |
| 9 | Beta, Gamma Function & its properties; | | | | | | |
| 10 | Differentiation under integral sign & Problems; | | | | | | |
| 11 | Concept of Double Integration and problem Solving; | | | | | | |
| 12 | Application of double integration to find Area; | | | | | | |
| 13 | Concept of Triple integration and problem Solving; | | | | | | |
| 14 | Dirichlet's theorem and Problems; | | | | | | |
| 15 | Application of triple integration to find Volume; | | | | | | |

Text Books:

- 1) Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).
- 2) Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)

Reference Books:

- 1) Higher Engineering Mathematics, 22e, by H. K. Das (S. Chand Publication, Delhi).
- 2) Advanced Engineering Mathematics, 4e, by S.R.K. Iyengar, Rajendra K. Jain (Alpha Science International, Ltd).
- 3) Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning).
- 4) Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
- 5) Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).



| Program: B. Tech. (Computer Engineering) | | | | Semester: II | | | |
|--|--|----------|--------|-------------------|-----|-----|-----------------|
| Course: Engineering Physics | | | | Code: BSH22A02 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 3 | - | - | 3 | 20 | 30 | 50 | 100 |
| Prior Knowledge: 1) Wave theory of light 2) Elasticity 3) Atom, molecule & nuclei 4) Current, electricity & magnetism 5) Electromagnetic Induction | | | | | | | |
| Course Objectives: This course aims at enabling students, 1) To build strong conceptual understanding of Optics, Semiconductor Physics & Quantum Physics 2) To explore advances in Physics with introduction of Lasers, Nanotechnology & Superconductivity 3) To provide consciousness about the importance of Physics principles in various engineering applications | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: 1) Interpret intensity variation due to optical phenomena like interference and relate these concepts to various engineering applications 2) Apply basics of semiconductor physics to explain the behavior of charge carriers inside a semiconductor 3) Illustrate the working principle of laser and their prominent applications 4) To distinguish wave behavior of a matter particle for the manipulation of the processes at quantum scale. 5) Interpret properties of superconductors & their applications in advanced technologies 6) Summarize properties, preparation methods of nanomaterials & explore their applications in various engineering fields | | | | | | | |
| Unit | "Knowledge is Freedom" | | | | | | Duration (Hrs.) |
| 1 | Wave Optics Interference: Interference, phase difference & path difference between waves, constructive & destructive interference, phase difference due to reflection at boundaries of optical interfaces, thin film, interference due to thin film of uniform thickness, conditions of maxima and minima, anti-reflection coating as an application of interference Diffraction: Diffraction, Fraunhofer diffraction at a single slit (Qualitative)-condition of maxima and minima, resultant intensity distribution pattern, diffraction grating (Qualitative), introduction to X-Ray diffraction | | | | | | 7 |
| 2 | Semiconductor Physics Band Theory of solids, Electrical conductivity of conductors & semiconductors, Hall effect (with derivation), Fermi Dirac probability distribution function, Fermi energy, position of Fermi level in intrinsic semiconductors (Qualitative) & in extrinsic semiconductors, dependence of Fermi level on temperature & doping concentration, energy band diagram of P-N Junction diode, solar cell I-V characteristics. | | | | | | 6 |
| 3 | Laser & Fiber Optics Laser: Introduction, interaction of light with matter- absorption, spontaneous emission, stimulated emission, population inversion, metastable state, active system, resonant cavity, characteristics of laser, semiconductor hetero-junction laser, carbon dioxide laser, applications of laser-industrial, defense & medical; introduction to holography Fiber Optics: Propagation of light in optical fibers, acceptance angle, numerical aperture, modes of propagation, types of fibers- step index, graded index, single mode & multi-mode; Losses -attenuation, dispersion | | | | | | 8 |

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|---|--|-----------|
| 4 | <p>Quantum Mechanics Limitations of classical physics, need of quantum mechanics, wave particle duality of radiation & matter, De Broglie hypothesis, De Broglie wavelength in terms of kinetic & potential energy, concept of wave packet, phase and group velocity, properties of matter waves, Heisenberg's uncertainty principle, wave function & probability interpretation, well behaved wave function, Schrodinger's time independent wave equation, applications of independent wave equation to the problem of (i) particle in rigid box, (ii) particle in a non-rigid box(qualitative), Tunneling effect, examples of tunneling effect, tunnel diode & scanning tunneling microscope (STM)</p> | 8 |
| 5 | <p>Magnetism and Superconductivity Magnetism: Classification of magnetic materials, temperature dependent magnetic transitions (Curie and Neel temperature), magnetic hysteresis loop, magneto-resistance, giant magneto-resistance (GMR), application of magnetic materials in magneto caloric effect, adiabatic demagnetization. Superconductivity: Introduction, critical temperature, properties of superconductors-zero electrical resistance, persistent current, Meissner effect, critical magnetic field, BCS theory, type I and II superconductors, low Tc and high Tc superconductors, Josephson effect, DC-SQUID-construction, working and applications, applications - superconducting magnets, maglev trains</p> | 8 |
| 6 | <p>Introduction to Nanoscience Introduction, surface to volume ratio, quantum confinement, properties of nanomaterials-optical, electrical, mechanical, magnetic; methods of preparation of nanomaterials- bottom-up and top-down approaches, physical methods- high energy ball milling, physical vapor deposition; chemical method - colloidal route for synthesis of gold nanoparticle , aerogels-properties and applications, applications of nanomaterials in medical, energy, automobile, space, defense; introduction to quantum computing.</p> | 8 |
| Total | | 45 |
| <p>Text Books: 1) A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, S. Chand & Company Pvt. Ltd. 2) Engineering Physics-R.K. Gaur, S. L Gupta, -Eighth revised edition 2012, Dhanpatrai Publications (P) Ltd. 3) Nanotechnology -Principles & Practices - Sulabha K. Kulkarni -Third edition -Capital Publishing Company.</p> <p>Reference Books: 1) Lasers & nonlinear Optics-B. B. Laud-Third edition, New Age International (P)Ltd. Publishers. 2) Fundamentals of Optics- Francis A. Jenkins, Harvey E. White, Fourth edition, McGraw Hill Education (India) Pvt. Ltd. 3) Fundamentals of Physics- Resnick & Halliday (John Wiley & sons) 4) An introduction to Laser's theory and applications – Dr. M. N. Avdhanulu, Dr. P.S. Hemne– Revised edition 2017-S. Chand & Company Pvt. Ltd. 5) Introduction to Quantum Mechanics. - David J. Griffiths, Darrell F. Schroeter, Third edition, Cambridge University Press. 6) Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd. 7) Nano: The Essentials. -T. Pradeep. First edition 2007. McGraw Hill Education.</p> | | |

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|---|---|-----------------|---------------|--------------------------|-----------------------|------------------|--------------|
| Program: B. Tech. (Computer Engineering) | | | | | Semester: II | | |
| Course: Engineering Physics Laboratory | | | | | Code: BSH22A03 | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | Oral | Practical | Total |
| - | 2 | - | 1 | 50 | - | - | 50 |
| Prior Knowledge: | | | | | | | |
| 1) Wave theory of light 2) Elasticity 3) Atom, molecule & nuclei 4) Current, electricity & magnetism 5) Electromagnetic Induction | | | | | | | |
| Course Objectives: This course aims at enabling students, | | | | | | | |
| 1) To provide better understanding of concepts, principles of Physics by giving hands on experience 2) To develop an insight in scientific experimental methodologies | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: | | | | | | | |
| 1) Develop an ability to handle measuring instruments and understand uncertainty and errors involved in various measurements 2) Apply the knowledge of Physics to learn various experimental methodologies - by performing experiments related to optics, sound, semiconductors, magnetism & Laser | | | | | | | |
| Unit | Description (Any 10 experiments from following list) | | | | | | |
| 1 | To determine the radius of curvature of Plano-convex lens using Newton's rings. | | | | | | |
| 2 | To determine unknown wavelength by using plane diffraction grating. | | | | | | |
| 3 | To verify Malus Law of polarization of light. | | | | | | |
| 4 | To determine refractive indices and identification of types of crystal using double refraction. | | | | | | |
| 5 | To determine the number of lines on grating surface using Laser. | | | | | | |
| 6 | To study IV characteristics of solar cell and determine fill factor. | | | | | | |
| 7 | To determine band gap of given semiconductor. | | | | | | |
| 8 | To determine Hall coefficient and charge carrier density. | | | | | | |
| 9 | To determine Magnetic susceptibility of given material by Quinke's Tube Experiment. | | | | | | |
| 10 | To determine compressibility of given liquid using Ultrasonic Interferometer. | | | | | | |
| 11 | To Determine specific rotation of a solution with Laurent's Half Shade Polari meter | | | | | | |
| 12 | To Determine electrical resistivity of given semiconductor using four probe method | | | | | | |
| Text Books: | | | | | | | |
| 1) A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, S. Chand & Company Pvt. Ltd. 2) Engineering Physics-R.K. Gaur, S. L Gupta, -Eighth revised edition 2012, Dhanpatrai Publications (P) Ltd. | | | | | | | |
| Reference Books: | | | | | | | |
| 1) Lasers & nonlinear Optics-B. B. Laud-Third edition, New Age International (P) Ltd. Publishers. 2) Fundamentals of Optics- Francis A. Jenkins, Harvey E. White, Fourth edition, McGraw Hill Education (India) Pvt. Ltd. 3) Fundamentals of Physics- Resnick & Halliday (John Wiley & sons) 4) An introduction to Laser's theory and applications – Dr. M. N. Avadhanulu, Dr. P.S. Hemne– Revised edition 2017-S. Chand & Company Pvt. Ltd. 5) Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd. | | | | | | | |

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|---|---|-----------------|---------------|--------------------------|------------|------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: II | | | |
| Course: Object Oriented Programming | | | | Code: BCE22B04 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 3 | - | - | 3 | 20 | 30 | 50 | 100 |
| Prior Knowledge: Basic programming concepts | | | | | | | |
| Course Objectives: This course aims at enabling students, 1. To acquire the fundamental principles, concepts and constructs of Object Oriented Programming 2. To gain knowledge about the capability to store information together in an object 3. To use the object-oriented paradigm in program design. 4. To build the programming skills using C++ 5. To understand about constructors which are special type of functions 6. To process data in files using file I/O functions. | | | | | | | |
| Course Outcomes: After learning the course, the students will be able to: 1. Explore the strengths of object-oriented programming. 2. Identify the objects & their relationships to build the object-oriented solution 3. Demonstrate the concept of Functions, overloading functions, passing variables to functions 4. Apply the concept of Inheritance and polymorphism in C++ 5. Use of exception handling in C++ 6. Explore the concept of file handling. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | Introduction Introduction, Role of programming languages, need to study programming languages, Characteristics of good programming languages. Introduction to various programming paradigms: Procedural, object-oriented, logical and functional, Features of OOP. Comparison of Procedural and Object oriented programming language. User defined types, structures, unions, polymorphism, encapsulation. C++ syntax, data-type, variables, strings, functions, default values in functions, recursion, namespaces, operators, flow control, arrays and pointers. Variables and Data Types, Conditional Approach, Iterative Approach. | | | | | | 8 |
| 2 | Abstraction mechanism Classes, private, public, constructors, destructors, member data, member functions, inline function, friend functions, static members, and references, Tokens, Expressions and Control Structures, Overloading - Overloading unary and binary operators – Overloading Using Friend functions – manipulation of Strings using | | | | | | 7 |
| 3 | Inheritance Class hierarchy, derived classes, single inheritance, multiple, multilevel, hybrid inheritance, role of virtual base class, constructor and destructor execution, base initialization using derived class constructors. | | | | | | 8 |

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|---|--|-----------|
| 4 | Polymorphism Binding, Static binding, Dynamic binding, Static polymorphism: Function Overloading, Ambiguity in function overloading, Dynamic polymorphism: Base class pointer, object slicing, late binding, method overriding with virtual functions, pure virtual functions, abstract classes. | 7 |
| 5 | Generic Programming & Exception Handling Introduction to generic programming, Function Template, Class Templates, Template with multiple parameters. Exception Handling - Exception Handling: Fundamentals multiple catching nested try statements uncaught exceptions throw and rethrow Stack unwinding. | 8 |
| 6 | File handling Introduction, Classes for File Stream operations, opening and closing files, detecting end of file, Open(): file modes, File pointer and their manipulations, Sequential Input and output file operations, Updating the file: Random access, Error handling during file operations | 7 |
| Total | | 45 |
| Text Books: | | |
| <ol style="list-style-type: none"> Balagurusamy, E. "Object oriented programming with C++." (2021). Lafore, Robert. Object-oriented programming in C++. Pearson Education, 1997. Stroustrup, Bjarne. "What is object-oriented programming?" IEEE software 5, no. 3 (1988): 10-20. | | |
| Reference Books: | | |
| <ol style="list-style-type: none"> Wiener, Richard S., and Lewis J. Pinson. An introduction to object-oriented programming and C++. Addison-Wesley Longman Publishing Co., Inc., 1988. Rai, Laxmisha, ed. Programming in C++: Object Oriented Features. Vol. 5. Walter de Gruyter GmbH & Co KG, 2019. Bjarne Stroustrup, The C++ Programming language, Third edition, 2008, Pearson Education. ISBN 9780201889543. Deitel, C++ How to Program, 4 th Edition, Pearson Education, 2002, ISBN:81-297-0276-2. Herbert Schildt, C++ The complete reference, Eighth Edition, McGraw Hill Professional, 2011, ISBN:978-00-72226805. | | |
| E Sources | | |
| <ol style="list-style-type: none"> http://www.cplusplus.com (C++ documents, tutorials, and references). GNU GCC (GNU Compiler Collection) @ http://gcc.gnu.org, with source codes. Bjarne Stroustrup's C++11 FAQ @ http://www.stroustrup.com/C++11FAQ.html. https://www.javatpoint.com/cpp-oops-concepts | | |
| NPTEL Course | | |
| <ol style="list-style-type: none"> https://onlinecourses.nptel.ac.in/noc21_cs02/preview | | |

| | | | | | | | |
|---|------------------|-----------------|---------------|--------------------------|-----------|-----------|--------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: II | | | |
| Course: Object Oriented Programming Laboratory | | | | Code: BCE22B05 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | PR | OR | Total |
| - | 4 | - | 2 | 50 | - | 50 | 100 |
| Prior Knowledge: - Nil | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <ol style="list-style-type: none"> 1. Develop critical thinking and problem-solving ability by using the characteristics of an object-oriented approach. 2. Build the programming skills using C++ 3. Apply the appropriate Object-Oriented features for various applications. 4. Handle Exceptions to control errors. 5. Managed the files and templates in C++ 6. Teach the student to implement object oriented paradigm. | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Identify the technical aspects of the problem statement with a comprehensive and systematic approach. 2. Apply various object-oriented features for problem solving. 3. Apply the concept of Inheritance 4. Implement the concept of polymorphism for problem solving 5. Demonstrate the use of exception handling in C++ 6. Implement the various operations in file handling. | | | | | | | |
| Guidelines for Students: | | | | | | | |
| <ol style="list-style-type: none"> 1. Students are expected to work on Assignments/Experiments throughout the semester. 2. Throughout the laboratory process, students must define and analyze the problem, generate learning issues and apply what they have learned to solve the problem. 3. Each student recommended to perform all assignments 4. At the end of each assignment content of OOP is to be applied in the Assignment/ Experiments. 5. Assignments should be implemented in C++ language. 6. Operating System recommended: - 64-bit Open source Linux or its derivative. 7. Programming tools recommended: - G++/GCC, Eclipse. | | | | | | | |
| Guidelines for Laboratory/Term Work Assessment: | | | | | | | |
| <ol style="list-style-type: none"> 1. Continuous assessment of laboratory work is done based on overall performance and Laboratory performance of students. 2. Each Laboratory assignment assessment should assign grade/marks based on parameters with appropriate weightage. 3. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include timely completion, performance, innovation, efficiency, punctuality and neatness. | | | | | | | |
| Guidelines for Laboratory Conduction | | | | | | | |
| <ol style="list-style-type: none"> 1. Instructor must regularly monitor and mentor students for successful completion of the Assignments/Experiments throughout semester as per instructions given in list of assignments. 2. Instructor is expected to form assignments from the set of suggested assignment. 3. Instructor is expected to complete all assignments 4. Instructor is expected to encourage students for appropriate use of Hungarian notation, proper indentation and comments. 5. Instructor is expected to encourage use of open-source software. | | | | | | | |

| Assignment No. | Assignment Title |
|----------------|--|
| 1 | Basic C++ programs – Input/Output, class, object, control Statement, looping, array, strings. |
| 2 | a. Write a C++ program to find the sum of individual digits of a positive integer. b. Write a C++ program to generate the first n terms of the sequence. |
| 3 | a. Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user. b. Write a C++ program to find both the largest and smallest number in a list of integers. |
| 4 | a. Write a C++ program to sort a list of numbers in ascending order. b. Write a C++ Program to illustrate New and Delete Keywords for dynamic memory allocation |
| 5 | a. Write a C++ program Illustrating Class Declarations, Definition, and Accessing Class Members. b. Write a C++ Program to illustrate default constructor, parameterized constructor and copy constructors |
| 6 | Write a C++ Program to Implement a Class STUDENT having Following Members: Data members Sname - Name of the student Marks- array Marks of the student Total -Total marks obtained Tmax- Total maximum marks Member functions assign()- Assign Initial Values compute() -to Compute Total, Average display()- to Display the Data. |
| 7 | a. Write a C++ Program to Demonstrate the i) Operator Overloading. ii) Function Overloading. b. Write a C++ Program to Demonstrate Friend Function and Friend Class |
| 8 | a. Write a C++ Program to Access Members of a STUDENT Class Using Pointer to Object Members. b. Write a C++ Program to Generate Fibonacci Series use Constructor to Initialize the Data Member |
| 9 | Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are: a) Reading a matrix. b) Addition of matrices. c) Printing a matrix. d) Subtraction of matrices. e) Multiplication of matrices |
| 10 | Write C++ programs that illustrate how the following forms of inheritance are supported: a) Single inheritance b) Multiple inheritance c) Multi level inheritance d) Hierarchical inheritance |
| 11 | a. Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class. b. Write a C++ Program to Invoking Derived Class Member Through Base Class Pointer |
| 12 | a. Write a C++ Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly. b. Write a C++ Program to Demonstrate the Catching of All Exceptions. |

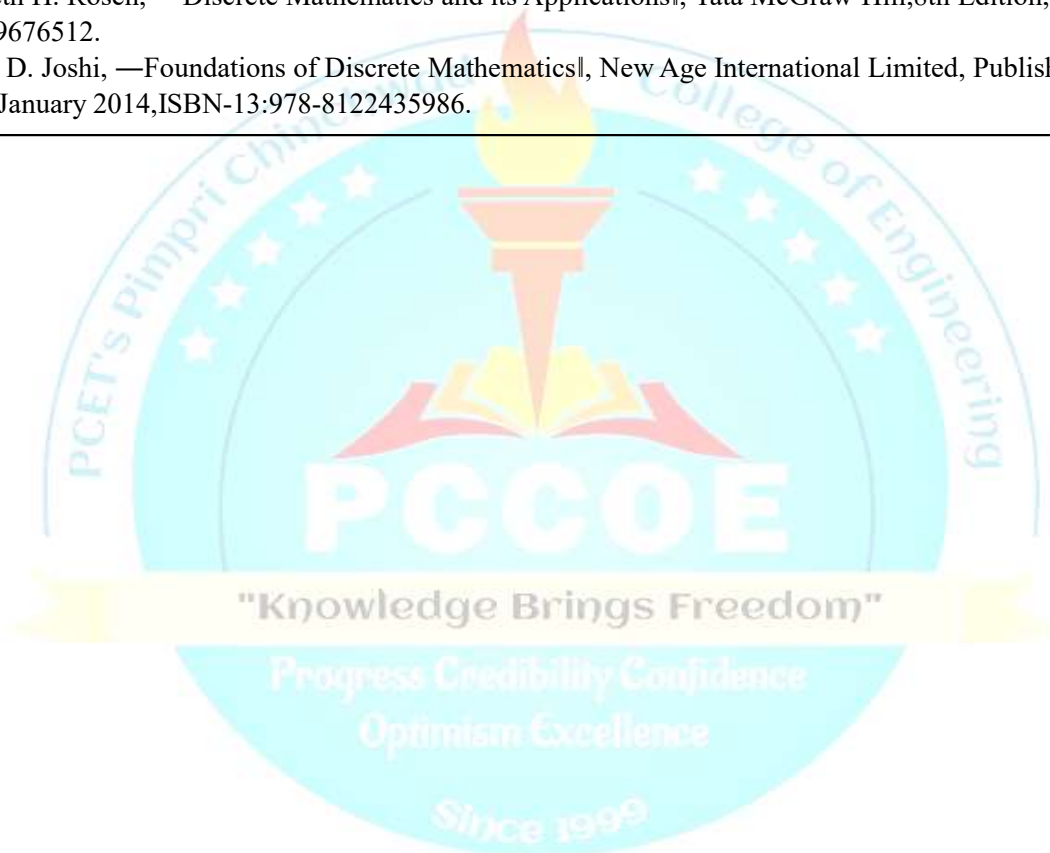
Reference Books:

1. Balagurusamy, E. "Object oriented programming with C++." (2021).
2. Lafore, Robert. Object-oriented programming in C++. Pearson Education, 1997.
3. Richard F. Gilberg&Behrouz A. Forouzan, "Data Structures, Pseudo code Approach with C", Cengage Learning India Edition, 2nd Edition, 2007, ISBN 10: 8131503143 / ISBN 13: 9788131503140.
4. Herbert Schildt, "C++: The Complete Reference", McGraw Hill Education, 4th Edition, July 2017, ISBN-10: 007053246X (ISBN-13 : 978-0070532465).
5. Y. Langsam, M. Augenstin and A. Tannenbaum, "Data Structures using C", Pearson Education Asia, First Edition, 2002, ISBN 978-81-317-0229-1.
6. BjarneStroustrup, "The C++ Programming language", Pearson Education, 3rdedition, 2008, ISBN 9780201889543.



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|---|--|-----------------|---------------|--------------------------|------------|------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: II | | | |
| Course: Discrete Mathematics | | | | Code: BCE22C01 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | IE | MTE | ETE | Total |
| 2 | - | - | 2 | 20 | | 30 | 50 |
| Prior Knowledge: Linear Algebra and Univariate Calculus | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <ol style="list-style-type: none"> 1. To use appropriate set, function and relation models to understand practical examples, and interpret the associated operations and terminologies in context. 2. Learn logic and proof techniques to expand mathematical maturity. 3. Interpret set theory, graph theory and algebraic structure. 4. Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly. | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Solve real world problems logically using appropriate set and logic. 2. Identify various types of relations, functions and their properties. 3. Use the concept of graphs, trees and related discrete mathematics for problem solving. 4. Comprehend the basic results of group and ring theory. | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | <p>Set Theory and Logic Significance of Discrete Mathematics in Computer Engineering, Application areas in Computer Engineering. Set Theory: Introduction to Set, Set Representation, Set Builder form, roster form, Types of Sets, Set Operations, Principle of Inclusion and Exclusion. Logics and Proofs: "Knowledge Brings Freedom" Propositions, Conditional Propositions, Truth Tables, Logical Connectivity, Proposition calculus, Translating English Statements into Propositions. Mathematical Induction.</p> | | | | | | 7 |
| 2 | <p>Relation and Function Relation: Relation Definition, Properties of Binary Relations, Closure of Relations, Warshall's Algorithm, Equivalence Relations and Equivalence Classes, Partitions, Partial Ordering Relations, Hasse Diagrams and Lattices, Chains and Anti-chains. Function: Function Definition, Composition of Functions, Injective, Surjective and Bijective Function, Inverse of a Function.</p> | | | | | | 7 |
| 3 | <p>Graph and Trees Graph: Basic Terminology and Special Types of Graphs, Paths and Circuits, Hamiltonian and Euler Paths and Circuits, Isomorphic Graphs, Planer Graph, Dijkstra's Shortest Path Algorithm. Trees: Trees, Rooted Trees, Prefix Codes, Spanning Trees, Minimum Spanning Trees, Kruskal's and Prim's Algorithm for Minimum Spanning Tree.</p> | | | | | | 9 |

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| 4 | Group Theory Basic Properties of Group, Semigroup & Monoid, Abelian group, Subgroup, Normal subgroup, Groups and Coding. Rings, Integral Domain and Field. | 7 |
| Total | | 30 |
| Text Books: | | |
| 1. C. L. Liu, —Elements of Discrete Mathematics, TMH, th Edition, 2017, ISBN 978-1259006395. | | |
| Reference Books: | | |
| 1. Kenneth H. Rosen, —Discrete Mathematics and its Applications, Tata McGraw-Hill, 8th Edition, 2018, ISBN 978-1259676512. | | |
| 2. Dr. K. D. Joshi, —Foundations of Discrete Mathematics, New Age International Limited, Publishers, 2nd Edition, January 2014, ISBN-13: 978-8122435986. | | |



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|---|------------------|-----------------|---------------|--------------------------|------------------|-------------|--------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: II | | | |
| Course: Computer Programming & Problem Solving Laboratory 2 | | | | Code: BCE22G02 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | Practical | Oral | Total |
| - | 4 | - | 2 | 100 | - | - | 100 |
| Prior Knowledge: -NIL | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <ol style="list-style-type: none"> 1. Provide basic Program structure, variables, operators, and Expressions in Python language. 2. To make students familiar with the use of control flow tools in Python 3. To Provide knowledge about different data structures in Python 4. To explore the use of modules/functions in Python 5. To explore classes and Object-oriented concepts in Python programming 6. To get acquainted the use of I/O, error, and exception handling in Python programming. | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Illustrate the use of variables, operators, and expressions in a Python program. 2. Use control flow statements to implement logic in programs. 3. Apply different data structures from the Python language to solve problems. 4. Implement modules in the program to simplify problem solutions. 5. Apply object-oriented concepts to solve real-world problems. 6. Elaborate the error and exception handling in programs. | | | | | | | |
| <p>Guidelines for Students:</p> <ol style="list-style-type: none"> 1. The laboratory assignments are to be submitted by students in the form of a journal. 2. Journal consists of a prologue, certificate, table of contents, and write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Date of Completion, Assessment grade/marks and assessor's sign, Theory Concept, algorithm, time complexity, sample input and expected output, conclusion). 3. Program codes with sample output of all performed assignments are to be submitted as a softcopy. <p>Guidelines for Laboratory/Term Work Assessment:</p> <ol style="list-style-type: none"> 1. Continuous assessment of laboratory work is done based on overall performance and Laboratory performance of students. 2. Each Laboratory assignment assessment should assign grade/marks based on parameters with appropriate weightage. 3. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include timely completion, performance, innovation, efficiency, punctuality and neatness. <p>Guidelines for Laboratory Conduction</p> <ol style="list-style-type: none"> 1. Set of suggested assignment lists is provided. 2. All assignments from group A are compulsory 3. Solve any five assignments from Group B. 4. Solve any three assignments from Group C. 5. Theory and concept need to be covered before conducting an assignment. 6. Operating System recommended: - 64-bit Open-source Linux or its derivative 7. Programming tools recommended: - PYTHON 3 | | | | | | | |
| Suggested List of Assignments | | | | | | | |

| Assignment No. | Assignment Title |
|----------------|---|
| Group A | |
| 1 | Write a Python program to convert Celsius temperature to its equivalent temperature in Fahrenheit. Accept Celsius temperature from the user and display Fahrenheit temperature. |
| 2 | Implement a Python program to generate the first ten numbers in the Fibonacci series then find the average of those ten numbers. |
| 3 | Write a Python program to accept a string from the user. Generate a new string from the accepted string by shifting two characters to the right. Display the generated string. (e.g. if the input is 'college 2022' then the generated new string will be '22college 20'). |
| 4 | Write a program to accept n numbers from the user and store them in the list. Then create a dictionary consisting of Key: 'EVEN' and 'ODD' and values are corresponding even and odd number lists from accepted numbers |
| Group B | |
| 5 | Write a Python program to accept n numbers from the user. Then find the minimum, maximum, and mean values. Write different functions for calculating minimum, maximum, and mean values. |
| 6 | Write a Python program to find the gcd of given two numbers using recursive functions. |
| 7 | Write a Python program to calculate the area of the polygon (Circle and rectangle) using class and inheritance concepts. |
| 8 | Write a Python program to count the total characters, total words, total lines, and frequency of given words in the file. |
| 9 | Write a Python program to create a phone directory which consists of detail {Name, phone number, place}. The phone number in the directory should be 10 digits long. Do error and exception handling in the program. |
| 10 | Consider the list of stop words as {'i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', 'your', 'yours', 'yourself', 'yourselves', 'he', 'him', 'his', 'himself', 'she', 'her', 'herself', 'it', 'itself', 'they', 'them', 'their', 'theirs', 'themselves', 'what', 'which', 'who', 'whom', 'this', 'that'}. Write a python program to remove stopwords from the text file. |
| Group C | |
| 11 | Write a calculator for complex numbers. |
| 12 | Write a Python program for a timer application, where a time constraint is entered into the timer in terms of minutes and seconds, and once the timer started countdown gets started in reverse order of time (in minutes and seconds). Once the timer reaches to zero, it gives the message that timed up. The timer can be reset at any time. |

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| 13 | Write a Python program for the EMI calculator. In this application, the user enters the principal amount and tenure of a loan. There is a variable rate of interest on the basis of the CIBIL score. If the CIBIL score is greater than 800 then the rate of interest per annum will be 7.5% and if the score is less than 800 then it would be 8.3%. Find the emi amount for the loan amount. Also, display the table which shows the bifurcation of emi amount to Principal and interest for each month. |
| 14 | Write a program to make bar chart in Python. User prompt to enter x values and y values. Based on the values a bar chart is drawn and displayed. Save the bar chart in image file on the disk. (Use "Matplotlib" library to plot graphs) |
| 15 | Write a small banking application. Where the following operations can be performed. 1. Create an account, 2. Update account, 3. Withdraw amount 4. Deposit Amount 5. Display Balance 6. Display statement. Account information consists of {account holder name, balance, address, age}. Create additional fields wherever required. Create appropriate classes and handle error and exception in the program. |
| Text Books: | |
| <ol style="list-style-type: none"> 1. Guido van Rossum, and the Python development team, Python Tutorial, Python software foundation, Release 3.11.4, 2023 2. Fabrizio Romano, Heinrich Kruger, Learn Python Programming, Third Edition, Packt Publication, 2021. | |
| Reference Books: | |
| <ol style="list-style-type: none"> 1. Dr. Charles R. Severance, Python for Everybody, Open Book, s licensed under a Creative Commons Attribution, 2023. 2. Martin C. Brown, Python: The Complete Reference, McGraw Hill Education, 1stEdition, 2018n-Non-Commercial Share Alike 3.0, Jun 2023. 3. Jeeva Jose, P. SojanLal, Introduction to Computing & Problem Solving with Python, Khanna Computer Book Store; First edition, 2016 4. R. Nageswara Rao, Core Python Programming, Dreamtech Press; Second edition, 2017. | |
| Web reference: | |
| <ol style="list-style-type: none"> 1. https://courses.analyticsvidhya.com/courses/introduction-to-data-science 2. https://pythonprogramming.net/introduction-learn-python-3-tutorials/ 3. https://nptel.ac.in/courses/106106182 4. https://pythonsa.com/. | |

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|--|--|-----------------|---------------|--------------------------|------------------|-------------|------------------------|
| Program: B. Tech. (Computer Engineering) | | | | Semester: II | | | |
| Course: Life Skills 2 | | | | Code: BSH22K01 | | | |
| Teaching Scheme | | | | Evaluation Scheme | | | |
| Lecture | Practical | Tutorial | Credit | TW | Practical | Oral | Total |
| - | 4 | - | 2 | 100 | - | - | 100 |
| Prior Knowledge: - Nil | | | | | | | |
| <p>Course Objectives: This course aims at enabling students,</p> <p>1) To equip them with essential skills and knowledge that complement their academic education, preparing them to excel not only as engineers but also as well-balanced individuals</p> <p>2) To develop students' vital life skills that promotes personal growth, resilience, and success in their academic journey and beyond</p> | | | | | | | |
| <p>Course Outcomes: After learning the course, the students will be able to:</p> <p>1) Understand the ways to nurture their passion.</p> <p>2) Develop skills growth mindset to be successful in personal and professional life.</p> <p>3) Demonstrate adaptability and flexibility for any environment.</p> <p>4) Apply essential skills for successful and happy life management.</p> | | | | | | | |
| Unit | Description | | | | | | Duration (Hrs.) |
| 1 | <p>Nurture Your Passion</p> <p>(i) Developing Hobbies- Importance, Ways and Benefits</p> <p>(ii) Exploring Skills - Singing/Painting/Dancing etc</p> <p>(iii) Sports: Basketball, Table tennis, Football and Volleyball</p> <p>(iv) Performing Arts: Painting/ Sketching/ Drawing</p> <p>(v) Stage performance</p> <p>(vi) Let's Play to Learn - games and play forms possible, like, Puzzles & Brainteasers, quiz.</p> | | | | | | 15 |
| 2 | <p>Lead Yourself - Growth Mindset</p> <p>(i) Understanding the concept for personal development.</p> <p>(ii) Embracing change: Coping with the dynamic nature of life</p> <p>(iii) Resilience and perseverance: Overcoming obstacles and setbacks</p> <p>(iv) Developing self-leadership skills and taking initiative/ responsibilities.</p> | | | | | | 15 |
| 3 | <p>Adaptability and Flexibility</p> <p>(i) Adaptability in a rapidly changing world</p> <p>(ii) Problem-solving and decision-making in dynamic situations. Approaching Problem Differently</p> <p>(iii) Embracing uncertainty: Coping with ambiguity and making the most of new opportunities</p> <p>(iv) Flexibility in teamwork: Navigating diverse team dynamics effectively.</p> | | | | | | 15 |
| 4 | <p>Life Management</p> <p>(i) Financial Literacy-Saving is earning, Value of money</p> <p>(ii) Coping up with Virtual Life and Reality</p> <p>(iii) Understanding the responsibilities and impact of Global Citizenship</p> <p>(iv) Environmental awareness and sustainable practices</p> <p>(v) Social responsibility: Contributing positively to the community.</p> | | | | | | 15 |
| Total | | | | | | 60 | |

Reference Books

- 1) "Mindset: The New Psychology of Success" by Carol S. Dweck Publisher: Ballantine Books
- 2) "The Financial Diet: A Total Beginner's Guide to Getting Good with Money" by Chelsea Fagan and Lauren VerHage
- 3) "Grit: The Power of Passion and Perseverance" by Angela Duckworth Publisher: Scribner, 2018

Weblinks

- 1) SkillsYouNeed (www.skillsyouneed.com): This website offers comprehensive information and practical guidance on a wide range of life skills, including communication, time management, problem-solving, and more
- 2) MindTools (www.mindtools.com): MindTools provides resources on personal effectiveness, leadership, communication skills, and other essential life skills to enhance professional and personal development
- 3) TED Talks (www.ted.com): TED Talks offer inspiring and informative speeches by experts and thought leaders covering various life skills topics, including resilience, emotional intelligence, and personal growth
- 4) Verywell Mind (www.verywellmind.com): This website covers mental health, emotional well-being, and self-improvement topics that contribute to overall life skills development

