

Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: BSC-101-BES Course Name: Engineering Mathematics-I		
Teaching Scheme	Credit	Examination Scheme
Theory : 3 Hours/Week Tutorial : 1 Hour/Week	03 01	CCE : 30 Marks End-Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: Differentiation, Integration, Maxima and Minima, Matrices and Determinants.		
Course Objectives: To familiarize the students with concepts and techniques in Calculus, Fourier series and Linear Algebra. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power, useful in their disciplines.		
Course Outcomes: After successful completion of the course, learner will be able to: CO1: Apply mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems. Determine the Fourier series representation and harmonic analysis of periodic functions in engineering applications. CO2: Evaluate derivative functions of several variables that are essential in various engineering problems. CO3: Apply the concept of Jacobian to find partial derivatives of implicit function and functional dependence. Use of partial derivatives in estimating errors & approximations and finding extreme values of the function. CO4: Apply the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, Linear dependence & Independence, finding linear and orthogonal transformations. CO5: Determine Eigen values & Eigen vectors. Use it to diagonalize matrix and to reduce quadratic form to canonical form, applicable to engineering problems.		
Course Contents		
Unit I	Single Variable Calculus	(08 Hours)
Rolle's Theorem, Mean Value Theorems, Taylor's and Maclaurin's Series, Indeterminate Forms and L' Hospital's Rule. Fourier series: Full range and Half range Fourier series, Harmonic analysis, Applications to problems in Engineering		
Unit II	Multivariable Calculus – Partial Differentiation	(08 Hours)

Introduction to functions of several variables, Limit, Continuity and Partial Derivatives. Euler's Theorem on Homogeneous functions, Partial derivative of Composite Function, Total Derivative and Change of

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First Year Engineering – 2024 Pattern - Faculty of Science and Technology

Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: BSC-102-BES Course Name: Engineering Physics		
Teaching Scheme	Credit	Examination Scheme
Theory : 03 Hours/Week Practical : 02 Hours/Week	03 01	CCE : 30 Marks End-Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: Bohr's atomic theory, properties of mechanical and electromagnetic waves, Huygens' principle and wavefront, interference and polarization of light, wave particle duality, intrinsic and extrinsic semiconductors, basics of magnetism, trigonometry and calculus.		
Course Objectives: The objective of the course is to impart the knowledge of fundamentals of physics through hands-on experiments and extend it to relevant engineering applications.		
Course Outcomes: After successful completion of the course, learner will be able to: CO1: Develop the understanding of working principle of lasers, optical fibers and extend it to holography and fiber optic communication. CO2: Deduce Schrödinger's wave equations and apply it to problems on the bound states by summarizing fundamentals of quantum physics. CO3: Explain phenomena of interference in thin films, polarization, double refraction and connect to the Anti-Reflection Coating, LCD. CO4: Develop understanding of Fermi level and Fermi energy in semiconductors on the basis of results of Fermi Dirac statistics and relate them with the working of semiconducting devices. Extend the understanding of Ultrasonic to thickness measurement, flaw detection. CO5: Explain properties of nanoparticles and estimate engineering applications; Explain phenomenon of Superconductivity and estimate engineering applications.		
Course Contents		
Unit I	Fundamentals of Photonics	(08 Hours)

Laser: Spontaneous and stimulated emission, population inversion, pumping, active medium & active center, resonant cavity; Characteristics of lasers, CO₂ laser: construction and working, Engineering applications of laser (IT, medical, industry), Holography (recording, reconstruction, applications); Optical

Optical fibers: Critical angle, acceptance angle, acceptance cone, numerical aperture, total internal reflection and propagation of laser; Classification of optical fibers: Single mode & multimode, step index & graded index, Attenuation: attenuation coefficient, causes of attenuation; Advantages of optical fiber communication, numerical problems on parameters of optical fiber.

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Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: BSC-103-BES Course Name: Engineering Chemistry		
Teaching Scheme	Credit	Examination Scheme
Theory : 03 Hours/Week Practical : 02 Hours/Week	03 01	CCE : 30 Marks End-Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: Types of titrations, structure property relationship, classification and properties of polymers, electromagnetic radiation, electrochemical series.		
Course Objectives: To acquire knowledge of water quality analysis technology and electro-analytical techniques for chemical analysis. Learn about specialty polymers and nanomaterials. Study conventional and alternative fuels, and understand corrosion mechanisms and prevention methods.		
Course Outcomes: After successful completion of the course, learner will be able to: CO1: Understand the practical approaches and techniques required to effectively monitor water quality. CO2: Select appropriate electro analytical techniques for understanding the materials. CO3: Demonstrate the structure and properties of advanced engineering materials for various technological applications. CO4: Analyze different types of conventional and alternative fuels. CO5: Explain causes of corrosion and methods for minimizing corrosion.		
Course Contents		
Unit I	Water Technology	(08 Hours)

Impurities in water, hardness of water: Types, Units and Numerical. Determination of hardness (by EDTA method using molarity concept) and alkalinity, numerical. Ill effects of hard water in boilers - priming and foaming, scale and sludge. Water treatment: i) Zeolite method and numerical ii) Demineralization method. Purification of water: Reverse osmosis and Electrodialysis. Modern technique for /of atmospheric water generation.

Unit II

Instrumental Methods of Analysis

(08 Hours)

Introduction: Types of reference electrode (calomel electrode), indicator electrode (glass electrode), ion selective electrode (solid membrane electrode)

[A] Conductometry: Introduction, conductivity cell, conductometric titrations of acid versus base with titration curve. (Strong acid- Strong base). Applications of conductometry.

[B] pHmetry: Introduction, standardization of pH meter, pH metric titration of strong acid versus strong base with titration curve and its applications.

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First Year Engineering – 2024 Pattern - Faculty of Science and Technology

Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: ESC-101-ETC Course Name: Basic Electronics Engineering		
Teaching Scheme	Credit	Examination Scheme
Theory : 02 Hours/Week Practical : 02 Hours/Week	02 01	CCE : 30 Marks End – Sem : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: Basic Physics and Mathematics, Semiconductor Physics, Digital Electronics, Circuit Theory, Analog Electronics, Sensors and Transducers		
Companion Course, if any: Laboratory Practical		
Course Objectives: 1. To understand the working principles of PN junction diode and Special purpose diodes. 2. To study the operating principle and applications of Bipolar Junction Transistors & MOSFET. 3. To learn the concepts of various logic gates, digital circuits, Microprocessor & Controller. 4. To understand the concepts of Opamp, its applications and electronic Instruments. 5. To know the methods of measurement of physical parameters using sensors and transmission with the help of communication systems.		

Course Outcomes:

On completion of the course, learner will be able to:

CO1: Know about the working of P-N Junction diode and its application as rectifier & switch, basics of LED & Photodiode.

CO2: Understand the working of BJT & MOSFET, their characteristics & compare. **CO3: Learn** logic gates & realization of the digital circuits.

CO4: Understand the functioning of Opamp and electronic instruments.

CO5: Select sensors based on their working principle for specific applications and its implementation with Communication system.

Course Contents

Unit I	Diodes and Applications	(06 Hours)
Evolution of Electronics, Current trends in Electronics, Impact of Electronics in industry and society. Introduction to active and passive components. P-N Junction Diode: P-N Junction diode construction and its working in forward and reverse bias conditions, V-I characteristics of P-N junction Diode, Diode as a switch, Half wave rectifier, Full wave and Bridge rectifier. Special purpose diodes: Light Emitting Diode (LED) and photo diode along with V- I characteristics and their applications.		
#Exemplar	LED TV, IR-Remote Controller, Rolling Displays, SMPS, Mobile & Laptop Chargers	
Syllabus for First Year of Engineering Unit II	Transistors and Technology	#25/65 (06 Hours)

First Year Engineering – 2024 Pattern - Faculty of Science and Technology

Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: ESE-102-ELE Course Name: Basic Electrical Engineering		
Teaching Scheme	Credit	Examination Scheme:
Theory : 02 Hours/Week Practical : 02 Hours/Week	02 01	CCE : 30 Marks End - Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: Electric charges and fields, Coulomb's laws, Voltage, Potential, Current, Ohms law, Magnetism, EMF, Faraday's Laws, Alternating current, AC Generator, Power.		
Companion Course, if any: Laboratory Practical		

Course Objectives:

To impart the fundamental knowledge of electrical engineering to all the students of various disciplines and give comprehensive idea about AC and DC circuit analysis, working principles and applications of basic electric machines. The aim is also to familiarize students with different wiring components, wiring schemes and electricity bill.

Course Outcomes:

On completion of this course, learners will be able to:

CO1: Apply Kirchhoff's Laws, Superposition theorem and network simplification techniques for DC circuit analysis.

CO2: Analyze the magnetic circuit parameters, self-Inductance, mutual Inductance and Electromotive Forces (EMF's).

CO3: Calculate AC quantities using mathematical equations, waveforms and phasor diagrams. **CO4: Compute** the voltage, current and power of the given 1-phase and 3-phase AC circuits

CO5: Understand the working principle of 1-Phase Transformer, Motors (DC, Induction) and their practical applications.

Course Contents

Unit I	Elementary Concepts and DC Circuits	(06 Hours)
Elementary concepts: Resistance, EMF, current, potential difference, Ohm's law. Overview of elementary power system showing stages such as Generation, Transmission, and Distribution of electrical energy. DC Circuits: Classification of electrical networks, simplifications of networks using series-parallel combinations and star delta transformation technique, Kirchhoff's Laws and their applications for network solutions using loop analysis, Superposition theorem		
#Exemplar	Electric power system, Electrical Load Distribution box, Robotics	
Unit II	Electromagnetism	(06 Hours)
Magnetic Circuit: Concept of flux density, field strength, permeability, MMF, reluctance, their units, and relationships. Simple series magnetic circuit, comparison of electric and magnetic circuit. Electromagnetic Induction: Faradays Laws of electromagnetic induction, Fleming's right-hand rule, statically and dynamically induced emf, self and mutual inductance, coefficient of coupling. Energy stored in magnetic field.		
#Exemplar	Loudspeaker, Motor, Generator, Transformer	

Course Code: ESC-103-MEC Course Name: Engineering Graphics		
Teaching Scheme	Credit	Examination Scheme
Theory : 02 Hours/Week Practical : 02 Hour/Week	02 01	CCE : 30 Marks End-Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: ● Basic Geometric Shapes ● Basic geometrical measurements (linear and angular), Construction ● Deviation of line, circle and polygon, Co-ordinate geometry. ● Computer literacy.		
Course Objectives: This course aims to cultivate students' ability to conceptualize physical objects and effectively translate them onto paper for communication in engineering contexts. It focuses on enhancing manual drawing skills, honing drawing interpretation abilities, and fostering a practical understanding of object dimensions. Additionally, the course seeks to introduce students to essential drawing and design software tools for a well-rounded skill set.		
Course Outcomes: On completion of the course, learner will be able to: CO 1 – Explain the fundamentals of Engineering Graphics and basic principles of geometric construction and apply the knowledge of Projections, Methods to prepare the drawings for points and lines. CO 2 - Apply the types of Projections, Methods to prepare the drawings for planes. CO 3 – Construct the various engineering curves and illustrate the application of various engineering curves and draw the development of the lateral surface of solid. CO 4 - Apply the concept of orthographic projection of an object to draw several 2D views for visualizing the physical state of the object. CO 5 - Apply the visualization skill to draw an isometric projection from given orthographic views.		
Course Contents		
Unit I	Fundamentals of Engineering Drawing and Projection of Point and Line	(06 Hours)
Fundamentals of Engineering Drawing: Introduction to drawing instruments and their uses, Drawing sheets sizes and their layouts, Types of Lines, Dimensioning methods, General rules of dimensioning. Projection of Point and Line. Theory of projection - Projection of points in all possible quadrants. Projection of line when parallel to both the reference planes, Projections of lines when it is perpendicular to one of the reference planes, when line is inclined to one and parallel to other reference plane, Line inclined to both reference planes (first angle projection).		

Unit II	Projection of Plane	(06 Hours)
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Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: ESC-104-CVL Course Name: Engineering Mechanics		
Teaching Scheme	Credit	Examination Scheme
Theory : 2 Hours/Week Practical : 2 Hours/Week	02 01	CCE : 30 Marks End-Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: • Basic Calculus, Trigonometry, Geometrical expressions, Laws of motion, Concept of mass, acceleration with Fundamental knowledge of Engineering Mathematics and Physics.		
Companion Course, if any: Laboratory Practical.		
Course Objectives: The objectives of this course is to make students to learn basics of engineering Mechanics concepts and its application to the real-world problems, solve problems involving Forces, loads and Moments and know their applications in allied subjects.		
Course Outcomes: On completion of the course, learner will be able to: CO1. Understand basic concept of forces, moments and couples in two-dimension force system CO2. Apply concept of free body diagram for static equilibrium in two-dimension force system CO3. Analyze the practical example involving friction and application of two force members CO4. Analyze rectilinear and curvilinear motion of particle CO5. Apply Newton's second law, work energy and impulse momentum principles for particles		
Course Contents		
Unit I	Force systems and its resultants	(06 Hours)
Introduction, type of motion, fundamental concepts and principle, force system, resolution and composition of forces, resultant of concurrent force system, moment of a force, Varignon's theorem, resultant of parallel force system, couple and resultant of general force system. Introduction, centroid of basic figures, centroid of composite figure, moment of inertia of simple geometrical figure, parallel axis theorem, perpendicular axis theorem, moment of inertia of composite figure.		
Unit II	Equilibrium	(06 Hours)
Introduction, free body diagram, equilibrium of coplanar forces, equilibrium of two forces, three force principle, equilibrium of concurrent, parallel and general force system, type of load, type of		

support, type of beam and support reaction.

UNIT III

Friction and trusses

(06 Hours)

Introduction, sliding and rolling friction, laws of coulomb friction, coefficient of friction, angle of repose, angle of friction, cone of friction, friction on inclined plane, ladder friction and belt friction.

Trusses: two force and multi force member, assumption of analysis, analysis of truss, identification of zero force members, method of joint and method of section.

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Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: ESC-105-COM Course Name: Fundamentals of Programming Languages		
Teaching Scheme	Credit	Examination Scheme
Theory : 2 Hours/Week Practical : 2 Hours/Week	02 01	CCE : 30 Marks End – Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: • Basics of Computers • Basic Mathematics		
Companion Course, if any: Fundamentals of Programming Languages Lab		
Course Objectives: 1. To understand the fundamental Concepts of C Programming 2. To acquire knowledge and Compare usage of Operators and Expressions in C Programming 3. To apply Control Flow structures in C Programming for Problem solving 4. To design a solution using Arrays, Character and String Arrays in C programming 5. To design a develop solution for simple computational problems using User Defined Functions and structures in C Programming		
Course Outcomes: On completion of the course, students will be able to: CO1: To Design algorithms for simple computational problems. CO2: To Use mathematical, Logical Operators and Expressions. CO3: To apply Control Flow structures for decision making. CO4: To design a solution using Arrays, Character and String Arrays. CO5: To Design and apply user defined functions and structures.		

Unit I	Introduction to Program Planning & C Programming	(06 Hours)
Program Design Tools: Art of Programming through Algorithms, Flowcharts. Overview of C: History and importance C, Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables, Storage Class, Assigning Values to variables, Defining Symbolic Constants, declaring a Variable as Constant, Declaring a Variable as Volatile.		
#Exemplar/Case Studies	Study of “C” Program compilation Process, testing and debugging.	
Unit II	Operators and Expressions	(06 Hours)
Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators,		

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Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: VSE-101 Course Name: Manufacturing Practice Workshop		
Teaching Scheme	Credit	Examination Scheme
Practical : 02 Hours/Week	01	Term Work : 25 Marks
Prerequisite Courses, if any: ● Basic Science ● Drawing		
Course Objectives: 1. To acquire the basic knowledge of Machine Tools. 2. To inculcate the basics of various manufacturing processes. 3. To impart practical aspects of Machine Tools and Manufacturing processes used in industrial applications 4. To develop the skill through hands-on practices using hand tools, power tools, machine tools in manufacturing and assembly shop		

Course Outcomes:

On completion of the course, learner will be able to:

CO1 Illustrate various sections of a typical workshop and different types of tools and machinery commonly found in a workshop	2-Understand
CO2 Explain the importance of workshop safety and apply general workshop safety rules and guidelines.	3-Apply
CO3 Demonstrate proficiency in various cutting techniques such as sawing, shearing, and laser cutting.	3-Apply
CO4 Plan and complete a simple sheet metal job from start to finish, incorporating shearing, bending, and joining operations.	3-Apply
CO5 Describe the applications, advantages and operation of advanced computerized machine tools in modern manufacturing.	2-Understand
CO6 Apply 3D Printing Technology including setup, operation, and post-processing to print simple mechanical component.	3-Apply

List of Laboratory Experiments/Assignments

01	Draw a typical layout of workshop with arrangement of equipment's considering a specific application
02	Identify and explain the following safety related consideration, 1) Potential hazards present in workshop 2) General workshop safety rules and guidelines 3) List various safety devices used in workshop Note : Photo evidences of above are expected in report
03	Develop any Mechanical component using the tools available in the workshop which includes any five of the following operations, 1) Cutting

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Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: VSE-102 Course Name: Design Thinking and Idea Lab		
Teaching Scheme	Credit	Examination Scheme
Practical : 2 Hour/Week	02	Term Work : 25 Marks

Course Objectives:

- **Understand** the core principles of design thinking and its role in engineering.
- **Apply** the six hats of design thinking to analyze and solve complex problems.
- **Develop** creative and user-centered solutions to real-world challenges.
- **Demonstrate** effective communication and collaboration in multidisciplinary teams.
- **Evaluate** and analysis design concepts and prototypes.
- **Develop** a mindset for continuous innovation and improvement.

Course Outcomes:

On completion of the course, learner will be able to:

CO1 Identify and define problems from a user's perspective and articulate design criteria.

CO2 Apply empathy and observation to gain insights into user needs and behaviors **CO3**

Generate innovative ideas and solutions through brainstorming and ideation. **CO4**

Prototype and test design solutions to refine and improve them

CO5 Present and communicate design ideas effectively using visual aids and storytelling

CO6 Collaborate with peers and industry professionals to address real-world design challenges

Note: -

1. The practical lab is designed to provide students with hands-on experience in applying the theoretical concepts they have learned in the course. The session aims to enhance their understanding, critical thinking, and problem-solving skills. (1 hour for explaining the concept and 1 hour for activity/ assignment / group discussion / brainstorming session)
2. Incorporating hands-on labs with access to various lab and workshop facilities in the Institute, can enhance the practical aspect of the course and provide students with opportunities to prototype and test their designs.

Laboratory Experiments/Assignments

Week	1-2	Introduction to Design Thinking • Understanding the design thinking process • Role of empathy and user-centric design • Practical Lab: Empathy mapping and user interviews • Assignment 1: Problem identification
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Teaching Scheme	Credit	Examination Scheme
Tutorial : 2 Hour/Week	02	Term Work : 25 Marks
Prerequisite Courses, if any: 12th English - Basic knowledge of Listening, Speaking, Reading, and Writing. (LSRW) skills.		
Course Objectives: To train the students in acquiring interpersonal communication skills by focusing on language skill acquisition techniques and error feedback.		
Course Outcomes: On completion of the course, learner will be able to: CO1: Recognize, identify, and express advanced skills of Technical Communication in English through Language Laboratory. CO2: Understand, categorize, differentiate, and infer listening, speaking, reading, and writing skills in societal and professional life. CO3: Articulate and present the skills necessary to be a competent Interpersonal communicator. CO4: Deconstruct, appraise, and critique communication behaviors. CO5: Adapt, negotiate, and facilitate with multifarious socio-economical and professional arenas with effective communication and interpersonal skills.		
Laboratory work should cover the following guideline topics for conduction of Laboratory activities:		
Unit I	Introduction to the Language Lab	
	a) The Need for a Language Laboratory b) Tasks in the Lab c) Writing a Laboratory Notebook	
Unit II	Active Listening Skills Basic Listening Skills: Introduction, the process, importance and types of listening, Effective Listening: Principles and Barriers, Guidelines to increase listening, a) What is Active Listening? b) Listening Sub-Skills—Predicting, Clarifying, Inferencing, Evaluating, Note-taking c) Listening in Business Telephony	
Unit III	Speaking	

Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: BSC-151-BES Course Name: Engineering Mathematics – II		
Teaching Scheme	Credit	Examination Scheme
Theory : 03 Hours/Week Tutorial : 01 Hour /Week	03 01	CCE : 30 Marks End-Semester : 70 Marks Term Work : 25 Marks
Prerequisites: Integration, Differential Equation, Three-dimensional coordinate systems		
Course Objectives: To familiarize the students with Advanced techniques of integration, Tracing of curve, Solid geometry, Multiple integrals and their applications, Mathematical modeling of physical systems using differential equations. The aim is to equip them with the concept and tools to understand advanced level mathematics and its applications, that would enhance thinking power, useful in their disciplines.		
Course Outcomes: After successful completion of the course, learner will be able to: CO1: Apply advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions useful in evaluating multiple integrals and their applications. CO2: Trace the curve for a given equation and measure arc length of various curves. Apply the concepts of solid geometry to solve problems on sphere, cone and cylinder in a comprehensive manner. CO3: Evaluate multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia. CO4: Apply the effective mathematical tools for solving first order ordinary differential equations such as Exact and Reducible to exact Linear and reducible to Linear. CO5: Model physical systems using ordinary differential equations, solve and analyze the solutions apply to Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.		
Course Contents		
Unit I	Integral Calculus	(08 Hours)
Reduction Formulae, Beta and Gamma functions, Differentiation Under Integral Sign and Error functions.		
Unit II	Curve Tracing and Solid Geometry	(08 Hours)

Tracing of Curves – Cartesian, Polar and Parametric curves, Rectification of curves.

Cartesian, Spherical polar and Cylindrical coordinate systems, Sphere, Cone and Cylinder.

Unit III

Multiple Integrals and Applications

(08 Hours)

Double and Triple integrations, change of order of integration, Applications to find Area, Volume, Mass, Centre of Gravity and Moment of Inertia.

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Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: PCC-151-ITT Course Name: Programming and Problem Solving		
Teaching Scheme	Credit	Examination Scheme
Theory : 02 Hours/Week Practical : 02 Hours/Week	02 02	CCE : 30 Marks End – Semester : 70 Marks Term Work : 25 Marks
Prerequisite Courses, if any: - Basics of Computers and Basic Mathematics - Fundamentals of Programming Languages (COM108)		
Companion Course, if any: Fundamentals of Programming Languages Lab		
Course Objectives: To understand problem solving aspects and to know python programming with learning data types, decision control statements, function, strings, file handling in Python. To learn features of object oriented programming concepts using python.		
Course Outcomes: On completion of the course, learner will be able to: CO1: Inculcate and apply various skills in problem solving. CO2: Choose appropriate programming constructs and features to solve the problems in diversified domains. CO3: Exhibit the programming skills for the problem-solving using functions and string manipulations. CO4: Demonstrate File handling and dictionaries in Python. CO5: Apply Object Oriented concepts in Python.		
Course Contents		
Unit I	Unit I : Problem Solving, Programming and Python Programming	(04 Hours)

General Problem Solving Concepts- Problem solving in everyday life, types of problems, problem solving with computers, difficulties with problem solving, problem solving aspects, top down design. Problem Solving Strategies, Basics of Python Programming: Features of Python, History and Future of Python, Programming Paradigm, Features of Object Oriented Programming, Applications of Python Languages.		
Unit II	Advance Data Types and Decision Control Statements	(04 Hours)
Advance data types- Tuples, Lists, Sets and Dictionary. Decision Control Statements: Decision control statements, Selection/conditional branching Statements: if, if-else, nested if, if-elif-else statements. Basic loop Structures/Iterative Statements, while loop, for loop, selecting appropriate loop. Nested loops, The break, continue, pass, else statement used with loops.		
Unit III	Functions and Strings	(03 Hours)
Need for functions, Function: definition, call, variable scope and lifetime, the return statement. Defining functions, Lambda or anonymous function, documentation string, good programming practices.		

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Savitribai Phule Pune University First Year of Engineering (2024 Pattern) Course Code: IKS-151 Course Name: Indian Knowledge System		
Teaching Scheme	Credit	Examination Scheme
Tutorial : 02 Hours/Week	02	Term Work : 25 Marks
Course Objectives: 1. To introduce students to the foundational concepts of Indian knowledge systems and their significance. 2. To familiarize students with key dates in Indian history and the historical timeline. 3. To provide an overview of Indian philosophical systems and their relevance. 4. To explore significant scientific achievements in ancient India and analyze scientific texts and inventions. 5. To examine the role of engineering in ancient India and its contributions to metallurgy, materials science, and architectural techniques.		

Course Outcomes:

On completion of this course, learners will be able to:

CO 1 - Understand the significance and historical context of Indian knowledge systems. **CO 2** - Comprehend Indian philosophical concepts, scientific achievements, and their interplay. **CO 3**- Recognize the role of engineering in ancient India and its impact on architecture and materials. **CO 4**- Apply ancient Indian engineering principles in modern practices while considering cultural and environmental aspects.

IKS Syllabus should be followed from the following link:

[http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2024/Indian%20Knowledge%20Systems%20\(IKS\)%20\(Generic\)%20Academic%20Year%202024-25_03062024.pdf](http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2024/Indian%20Knowledge%20Systems%20(IKS)%20(Generic)%20Academic%20Year%202024-25_03062024.pdf)

Note: This course will be available in online mode on SPPU portal for the all students.

Assignments for Term Work

Note: Students have to complete all Assignments and two activates from the following given list.

Assignment 1: Students should search for literature and create a presentation on a specific key date or event in Indian history. They should explain its significance and how it contributed to Indian knowledge systems.

Learning Outcome: Enhances research skills and understanding of the historical context.

Assignment 2: Assign groupsto compare and contrast the BC/CE dating system with other historicaldating systems from different cultures.

Learning Outcome: Promotes critical thinking and cross-cultural understanding. **Assignment 3:**

Students should study and create presentations or reports on significant scientific inventions or discoveries from ancient India.