



PPSU

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

B. TECH. (CHEMICAL ENGINEERING)

SYLLABUS BOOK

AY 2025-26

| INSTITUTE VISION | |
|--|--|
| To emerge as an Institute of Excellence by imparting value-based education aided with Research, Innovation and Entrepreneurial skills. | |

| INSTITUTE MISSION | |
|-------------------|---|
| 1. | To impart the holistic engineering education of highest quality & prepare socially responsible professionals with entrepreneurial skills. |
| 2. | To prepare value-aided engineering professionals to meet up global industry requirements by imparting cutting edge professional education. |
| 3. | To inculcate the attitude of research and innovation among the stake holders through experiential and project-based teaching-learning pedagogy. |
| 4. | To acquire global talent pool by providing world class amenities for teaching, learning & research. |

Graduates will demonstrate ability to:

| PEO No | PROGRAMME EDUCATIONAL OBJECTIVES |
|--------|--|
| PEO 1 | Solve real-world engineering problems, design and develop innovative and cost-effective solutions exhibiting engineering skills/fundamentals to cater needs of society. |
| PEO 2 | Excel in Industry/technical profession, higher studies, and entrepreneurship exhibiting comprehensive competitiveness. |
| PEO 3 | Exhibit professional ethics & values, effective communication, teamwork, multidisciplinary approach, and ability to relate engineering issues to broader societal framework. |

| PO No | PROGRAMME OUTCOMES |
|-------|--|
| PO 1 | Engineering knowledge: Apply knowledge of engineering fundamentals, science, mathematics & engineering specialization for the solution of complex engineering problems. |
| PO 2 | Problem analysis: Identify, formulate and analyze complex engineering problems leading to substantial conclusions using basic principles of mathematics, science and engineering. |
| PO 3 | Design/development of solutions: Develop solutions for complex engineering problems and design system components or processes meeting specified needs having due consideration for the safety and societal & environmental considerations. |
| PO 4 | Conduct investigations of complex problems: Use research-based knowledge & methods like design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid & viable conclusions. |
| PO 5 | Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools for prediction and modeling of complex engineering activities with an understanding of the limitations. |
| PO 6 | The engineer and society: Apply cognitive learning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and following responsibilities relevant to the professional engineering practice. |
| PO 7 | Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge & skill needed for sustainable development. |
| PO 8 | Values & Ethics: Apply basic moral values & ethical principles and pledge to professional ethics/norms and responsibilities of the engineering practice. |
| PO 9 | Individual and team work: Function effectively as an individual/as a team member or as a leader in diverse teams, and in multidisciplinary settings. |
| PO 10 | Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| PO 11 | Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments. |
| PO 12 | Life-long learning: Recognize the need, do necessary preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

| PSO No | PROGRAMME SPECIFIC OUTCOMES (PSO) CHEMICAL ENGINEERING |
|---------------|---|
| PSO 1 | Acquire and apply industry centric skills in the field of Chemical Engineering for the benefit of society. |
| PSO 2 | Develop an attitude to accept global challenges and apply Chemical Engineering knowledge for solving engineering problems related to core and interdisciplinary fields. |
| PSO 3 | Demonstrate and develop the appropriate solutions of the complex level of Chemical Engineering design-based problems to meet the specified needs and overall sustainability of the processes, considering the necessary approaches of safety, health hazards, societal and environmental factors. |

| Credit Guidelines (General) | | | |
|--|------------------|---------------|-----------------------------|
| Component | Hour/Week | Credit | Total Hours/Semester |
| Theory | 1 | 1 | 15 |
| Practical | 2 | 1 | 30 |
| Tutorial | 1 | 1 | 15 |
| Note: In specific cases; extra credits can be granted for specific/important subjects. | | | |

| CO-PO Mapping Guidelines | | |
|---------------------------------|----------------------|----------------------------------|
| Mapping Level | % age Mapping | Indicator |
| 0 / - | 0 | No Mapping |
| 1 | 0-33 | Low Level (Slightly Mapped) |
| 2 | 33-66 | Medium Level (Moderately Mapped) |
| 3 | >66 | High Level (Strongly Mapped) |

Syllabus Book

**B. Tech.
(Chemical Engineering)**

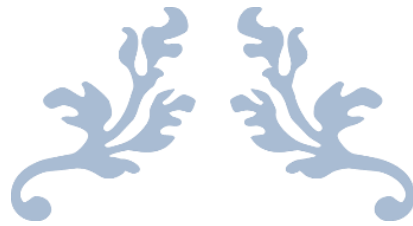


P P Savani University
School of Engineering

Effective From: 2025-26
Authored by: P P Savani University

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FIRST YEAR B. TECH.



| P P SAVANI UNIVERSITY | | | | | | | | | | | | | | | |
|---|-------------|--------------------------------------|------------|-----------------|-----------|----------|-------|--------|--------------------|-----|-----------|-----|----------|-----|-------|
| SCHOOL OF ENGINEERING | | | | | | | | | | | | | | | |
| TEACHING & EXAMINATION SCHEME FOR FIRST YEAR B.TECH. CHEMICAL ENGINEERING PROGRAMME AY: 2025-26 | | | | | | | | | | | | | | | |
| Sem | Course Code | Course Title | Offered By | Teaching Scheme | | | | | Examination Scheme | | | | | | |
| | | | | Contact Hours | | | | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | Theory | Practical | Tutorial | Total | | CE | ESE | CE | ESE | CE | ESE | |
| 1 OR 2 | SESH1110 | Calculus | SH | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SEME1210 | Basics of Mechanical Engineering | ME | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SEIT1210 | Python for Engineers | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SESH1130 | Experimental Physics | SH | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | CFLS2130 | Intermediate Communicative English | CFLS | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| | SESH1120 | Linear Algebra | SH | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SECV1210 | Basics of Civil Engineering | CV | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SECE1210 | Programming with C Essentials | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SEEC1210 | Basics of Electrical and Electronics | EC | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SEME1220 | Engineering Workshop | ME | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 40 | 60 | 0 | 0 | 100 |
| | SECE1220 | Digital Proficiency | IT | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| | | | | | | Total | 48 | 44 | | | | | | | 1900 |

| | | | | | | | | | | | | | | | |
|----------------|----------|--------------------------------------|------|---|---|--------------|-----------|-----------|----|----|----|----|-----|---|-------------|
| Group 1 | SESH1110 | Calculus | SH | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SEME1210 | Basics of Mechanical Engineering | ME | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SEIT1210 | Python for Engineers | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SESH1130 | Experimental Physics | SH | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | CFLS2130 | Intermediate Communicative English | CFLS | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| | | | | | | Total | 23 | 21 | | | | | | | 900 |
| Group 2 | SESH1120 | Linear Algebra | SH | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SECV1210 | Basics of Civil Engineering | CV | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SECE1210 | Programming with C Essentials | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SEEC1210 | Basics of Electrical and Electronics | EC | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SEME1220 | Engineering Workshop | ME | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 40 | 60 | 0 | 0 | 100 |
| | SECE1220 | Digital Proficiency | IT | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| | | | | | | Total | 25 | 23 | | | | | | | 1000 |

P P Savani University
School of Engineering

Department of Science and Humanities

Course Code: SESH1110

Course Name: Calculus

Prerequisite Course/s: Algebra, Geometry, Trigonometry & Pre-Calculus till 12th Standard level

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 03 | - | 02 | 05 | 40 | 60 | - | - | 100 | - | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the course:

To help learners to

- summarize concept of calculus to enhance ability of analysing mathematical problems.
- acquire knowledge and ability to work with differentiation and integration for applications of mathematical techniques in engineering.
- develop the tool of convergence or divergence of any infinite series and power series for learning advanced Engineering Mathematics.
- acquire knowledge of partial differentiation and ability to work with applications to advanced Engineering Mathematics.
- application of concavity of graph and find out points of inflection.

Course Content:

| Section I | | | |
|------------|--|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1. | Calculus Limits, Continuity, Types of Discontinuity, Successive Differentiation, Rolle's Theorem, LMVT, CMVT, Maxima and Minima. | 09 | 20 |
| 2. | Sequence and Series-I Convergence and Divergence, Comparison Test, Integral Test, Ratio Test, Root Test, Alternating Series, Absolute and Conditional Convergence. | 09 | 20 |
| 3. | Sequence and Series-II Power series, Taylor and Maclaurin series, Indeterminate forms and L'Hospital's Rule. | 05 | 10 |
| Section II | | | |
| Module No. | Content | Hours | Weightage in % |
| 4. | Partial Derivatives | 11 | 30 |

| | | | |
|----|---|----|-----|
| | Function of several variables, Partial differentiation, Applications, Chain rule, Linear approximations, Maxima and Minima, Euler's theorem, Lagrange multiplier. | | |
| 5. | Curve tracing Tracing of Cartesian Curves, Polar Coordinates, Polar and Parametric Form of Standard Curves, Areas and Length in Polar co-ordinates | 11 | 20 |
| | TOTAL | 45 | 100 |

List of Tutorials:

| Sr. No. | Name of Tutorial | Hours |
|---------|-----------------------|-------|
| 1. | Calculus-1 | 04 |
| 2. | Calculus-2 | 04 |
| 3. | Calculus-3 | 02 |
| 4. | Sequence and Series-1 | 04 |
| 5. | Sequence and Series-2 | 02 |
| 6. | Sequence and Series-3 | 02 |
| 7. | Partial Derivatives-1 | 04 |
| 8. | Partial Derivatives-2 | 02 |
| 9. | Curve tracing-1 | 04 |
| 10. | Curve tracing-2 | 02 |
| | TOTAL | 30 |

Text Book:

| Title | Author(s) | Publication |
|---------------------------|---|-------------|
| Thomas' Calculus | George B. Thomas, Maurice D. Weir and Joel Hass | Pearson |
| Elementary linear Algebra | Howard Anton and Chris Rorres | Wiley |

Reference Book:

| Title | Author(s) | Publication |
|---------------------------------------|-------------------------------|---------------------|
| Advanced Engineering Mathematics | E Kreyszig | John Wiley and Sons |
| A textbook of Engineering Mathematics | N P Bali and Manish Goyal | Laxmi |
| Higher Engineering Mathematics | B S Grewal | Khanna |
| Engineering Mathematics | T Veerarajan | Tata Mc Graw Hill |
| Engineering Mathematics-1 (Calculus) | H. K. Dass and Dr. Rama Verma | S. Chand |

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

- Continuous Evaluation consists of performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 50 marks
- Continuous Evaluation consists of self-performance assignment to 20 marks.

- Internal Viva consists of 30 marks.

Course Outcome(s):

After the completion of the course, the student will be able to

| SESH1110 | CALCULUS |
|-----------------|--|
| CO 1 | Recall the concepts of limit, continuity and differentiability for analysing mathematical problems. |
| CO 2 | Analyze the series for its convergence and divergence to solve real world problems. |
| CO 3 | Evaluate various limit problems using L' Hospital's rule. |
| CO 4 | Identify the ordinary differentials and partial differentials and solve the maximum and minimum value of function. |
| CO 5 | Construct the graphs for function with intervals and identify more application for function. |

Mapping of CO with PO

| SESH1110 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| CO 1 | 2 | 3 | 1 | 1 | | | | | | | | 1 |
| CO 2 | 3 | 2 | 1 | | | | | | | | | 1 |
| CO 3 | 2 | 2 | 1 | | | | | | | | | |
| CO 4 | 2 | 2 | 1 | 1 | | | | | | | | 1 |
| CO 5 | 2 | 2 | 1 | | | | | | | | | 1 |

Mapping of CO with PSO

| SESH1110 | PSO1 | PSO2 | PSO3 |
|-----------------|-------------|-------------|-------------|
| CO 1 | 3 | | |
| CO 2 | 1 | 1 | |
| CO 3 | 1 | 2 | |
| CO 4 | 3 | 2 | |
| CO 5 | 1 | 1 | |

Level of Bloom's Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|------------------|--------------------------|------------------|
| 1 | Calculus | 1, 2, 3, 4, 5 |
| 2 | Sequence and Series – I | 1, 2, 3, 4, 6 |
| 3 | Sequence and Series – II | 1, 2, 3, 4, 6 |
| 4 | Partial Derivatives | 1, 2, 3, 4, 5 |
| 5 | Curve tracing | 1, 2, 3, 4, 5, 6 |

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME1210

Course Name: Basics of Mechanical Engineering

Prerequisite Course(s): -- None

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 03 | - | 02 | 05 | 40 | 60 | - | - | 100 | - | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- study the fundamentals of mechanical systems.
- study and appreciate significance of mechanical engineering in different fields of engineering.
- carry out simple land survey and recent trends in civil engineering.
- understand components of building, building terminology and construction materials.

Course Content:

| Section I | | | |
|------------|---|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1. | Introduction to Boiler: Introduction, Fundamental Principles, Classification | 07 | 15 |
| 2. | Classification of Engineering Materials: Classification of engineering material, composition of cast iron, mechanical properties and uses; Alloy steel and their applications; Stress-Strain diagram, Hooks law and modulus of elasticity. Tensile, shear and hardness. | 10 | 20 |
| 3. | Fluids: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernoulli's equation for incompressible fluids, viscous and turbulent flow and Metacentric height. | 04 | 08 |
| 4. | Measurement: Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainty analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set. | 06 | 12 |
| Section 2 | | | |
| Module No. | Content | Hours | Weightage in % |

| | | | |
|----|--|----|-----|
| 5. | Basic Concepts of Thermodynamics: Prime Movers - Meaning and Classification; the Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific Heat Capacity, Internal Energy, Specific Volume; Thermodynamic Systems, All Laws of Thermodynamics | 04 | 09 |
| 6. | Basics of I.C Engines: Construction and Working of 2 Stroke & 4 Stroke Petrol and Diesel Engines, Difference Between 2-Stroke - 4 Stroke Engine & Petrol-Diesel Engine, Efficiency of I. C. Engines | 08 | 18 |
| 7. | Power Transmission Elements: Construction and Applications of Couplings, Clutches and Brakes, Difference Between Clutch and Coupling, Types of Belt Drive and Gear Drive | 06 | 18 |
| | TOTAL | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|---------|---|-------|
| 1. | To understand construction and working of various types of boilers | 04 |
| 2. | To understand construction and working of mountings | 04 |
| 3. | To understand construction and working of accessories | 04 |
| 4. | To understand construction and working 2 –stroke & 4 –stroke Petrol Engines | 02 |
| 5. | To understand construction and working 2 –stroke & 4 –stroke Diesel Engines | 02 |
| 6. | To understand the types of hardness test | |
| 7. | To understand the stress-strain curve for ductile and brittle material | |
| 8. | To understand the basic concept of metacentric height | |
| | TOTAL | 30 |

Text Book(s):

| Title | Author(s) | Publication |
|------------------------------------|-----------------------------|---------------------------------|
| Elements of Mechanical Engineering | S. B. Mathur, S. Domkundwar | Dhanpat Rai & Sons Publications |
| Material Science | Narula | TMH |
| Basic Mechanical Engineering | Agrawal B & CM | TMH |
| Instrumentation and Measurement | Nakra and Chaudhary | TMH |
| Combustion Engines | Ganesan | TMH. |

Reference Book(s):

| Title | Author(s) | Publication |
|------------------------------|--------------|---------------------------|
| Thermal Engineering | R. K. Rajput | Laxmi Publications |
| Basic Mechanical Engineering | T.S. Rajan | Wiley Eastern Ltd., 1996. |

Web Material Link(s):

- <http://nptel.ac.in/course.php>
- <http://nptel.ac.in/courses/105107157/>
- <http://nptel.ac.in/courses/105101087/>
- <http://nptel.ac.in/courses/105107121/>
- <http://nptel.ac.in/courses/105104100/>

Course Evaluation:**Theory:**

- Continuous evaluation consists of two tests each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination will consist of 60 marks.

Tutorial

- Continuous Evaluation consists of performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

| SEME1210 | BASICS OF MECHANICAL ENGINEERING |
|----------|--|
| CO 1 | Understand the concept of Boiler, Material types and its application. |
| CO 2 | Understand the Fluid properties and measurement process. |
| CO 3 | Understand the concept of basic thermodynamics |
| CO 4 | Comprehend the importance of mechanical engineering equipments like IC engine and power transmission elements. |

Mapping of CO with PO

| SEME1210 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 2 | 3 | 1 | 3 | 2 | 2 | | | | | | 3 |
| CO 2 | 2 | 3 | 1 | 3 | 2 | 2 | | | | | | 3 |
| CO 3 | 1 | 3 | 1 | 3 | 2 | 2 | | | | | | 3 |
| CO 4 | 1 | 3 | 1 | 3 | 2 | 2 | | | | | | 3 |

Mapping of CO with PSO

| SEME1210 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 2 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 3 | 2 | 2 |
| CO 4 | 3 | 2 | 2 |

Level of Bloom's Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|-----------|---|-----------|
| 1 | Introduction to Boiler | 1, 2, 3 |
| 2 | Classification of Engineering Materials | 1, 2 |
| 3 | Fluids | 1, 2 |
| 4 | Measurement | 1, 2 |
| 5 | Basics Concept of Thermodynamics | 1, 2, 3 |
| 6 | Basics of I.C. Engines | 1, 2 |
| 7 | Power Transmission Elements | 1, 2 |

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SEIT1210

Course Name: Python for Engineers

Prerequisite Course(s): --

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 03 | 02 | - | 04 | 40 | 60 | 40 | 60 | - | - | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the basic object-oriented programming.
- identify an appropriate approach to solve computational problems.
- develop logic building and problem-solving skills.

Course Content:

| Section I | | | |
|------------|--|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1. | Introduction to Python History, Features of Python, Applications of Python, Working with Python, Input and Output Functions in Python, Variable, Assignment, Types, Basic Operators, Expressions and Types of Data Int, Float, Complex, String, List, Tuple, Set, Dictionary and its Methods, Type Conversions, Comments, Input Processing and output. | 04 | 07 |
| 2. | Decision Structures in Python Conditional Blocks Using if, Else and Else If, Simple for Loops in Python, For Loop Using Ranges, String, List and Dictionaries Use of While Loops in Python, Loop Manipulation Using Pass, Continue, Break and Else | 04 | 07 |
| 3. | Array and Strings in Python Arrays, Basic Strings, Accessing Strings, Basic Operations, String Slicing, Testing, Searching and Manipulating Strings, Function and Methods. | 03 | 08 |
| 4. | Dictionary, List, Tuples and Sets Dictionaries, Accessing Values in Dictionaries, Working with Dictionaries, Properties, Functions and Methods. Sets, Accessing Values in Set, Working with Set Properties, Functions and Methods, Tuple, Accessing Tuples, Operations, Working, Functions and Methods. List, Accessing List, Operations, Working With Lists, Function and methods, two-dimensional lists. | 05 | 10 |
| 5. | Functions, Modules and Packages in Python Introduction to Functions, defining a Function, Calling a Function, Types of Functions, Function Arguments, Anonymous Functions, Global and Local Variables, Importing Module, Math Module, Random Module, Introduction to Packages: Numpy, Pandas, Matplotlib. | 07 | 14 |
| Section II | | | |
| Module No. | Content | Hours | Weightage in % |
| 6. | Python Object Oriented Programming OOP Concept of Class, Object and Instances, Constructor, Class, | 08 | 16 |

| | | | |
|--------------|--|----|-----|
| | Attributes, Methods, Using Properties to Control Attribute Access, and Destructors, Inheritance, Overloading Operators. Objects in Python: Creating Python Classes, Modules and Packages, Inheritance in Python, Polymorphism in Python. | | |
| 7. | Files & Regular Expression in Python Introduction to File Input and Output, Writing Data to a File, Reading Data from a File, Additional File Methods, Using Loops to Process Files, Processing Records, RE Module, Basic Patterns, Regular Expression Syntax, Regular Expression Object, Search Object, Findall method, Split method, Sub Method. | 05 | 15 |
| 8. | Exception Handling in Python Handling IO Exceptions, Working with Directories, Metadata, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Throwing Mechanism, Catching Mechanism | 05 | 09 |
| 9. | Building Desktop Application Exploring the Tkinter Library in Python, Creating basic Desktop application using Tkinter | 04 | 14 |
| TOTAL | | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|--------------|--|-------|
| 1. | Introduction to Python (Introduction to IDLE, different data types, Input Output in Python, Operators, Operator precedence). | 04 |
| 2. | Manipulation of Strings. | 04 |
| 3. | Implementation of Dictionaries, Sets in Python. | 03 |
| 4. | Implementation of Tuples and Lists in Python. | 03 |
| 5. | Working with decision structures in Python | 04 |
| 6. | Working with functions and modules in Python | 02 |
| 7. | Working with Object-oriented paradigms in Python | 04 |
| 8. | Implementation of file handling in Python. | 02 |
| 9. | Exception handling in Python | 02 |
| 10. | Building desktop application of your own calculator in Python. | 02 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|--|------------------------------|-------------|
| Python approach Programming: A modular | Sheetal Taneja, Naveen Kumar | Pearson |

Reference Book(s):

| Title | Author(s) | Publication |
|--|--|-----------------|
| Think Python: How to Think Like a Computer Scientist | Allen Downey | Green Tea Press |
| Python Cookbook | David Ascher, Alex Martelli Oreilly | O Reilly Media |

Web Material Link(s):

- <https://www.tutorialspoint.com/python/>
- <https://www.w3schools.com/python/>
- https://onlinecourses.nptel.ac.in/noc20_cs83/preview

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of practical performance which should be evaluated out of 10 for each practical and average of the same will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Exam.
- Viva-voce consists of 30 marks during End Semester Exam.

Course Outcome(s):

After completion of the course, the students will be able to

| SEIT1210 | PYTHON FOR ENGINEERS |
|----------|--|
| CO 1 | Interpret the fundamental python syntax, semantics and fluent in the use of python control flow statements. |
| CO 2 | Determine the methods to create and manipulate python programs by utilizing the data structures like lists, dictionaries, tuples and sets. |
| CO 3 | Articulate the object-oriented programming concepts such as encapsulation, inheritance and polymorphism as used in python. |
| CO 4 | Identify the commonly used operations involving file systems and regular expressions. |

Mapping of CO with PO

| SEIT1210 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 1 | 1 | 2 | 1 | 1 | | | | 3 | 2 | 1 | 3 |
| CO 2 | 2 | 2 | 2 | 2 | 1 | | | | 3 | 2 | 1 | 3 |
| CO 3 | 2 | 2 | 2 | 2 | 1 | | | | 3 | 2 | 1 | 3 |
| CO 4 | 2 | 2 | 2 | 2 | 1 | | | | 3 | 2 | 1 | 3 |
| CO 5 | 1 | 1 | 2 | 1 | 1 | | | | 3 | 2 | 1 | 3 |

Mapping of CO with PSO

| SEIT1210 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | | 2 |
| CO 2 | 2 | | 2 |
| CO 3 | 2 | | 2 |
| CO 4 | 2 | | 2 |
| CO 5 | 2 | | 2 |

Level of Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|-----------|---|-----------|
| 1. | Introduction to Python | 1,2,4 |
| 2. | Decision Structures in Python | 1,2,3 |
| 3. | Array and Strings in Python | 1,2,3 |
| 4. | Dictionary, List, Tuples and Sets | 2,3,4 |
| 5. | Functions, Modules and Packages in Python | 2,3,4 |
| 6. | Python Object Oriented Programming | 3,4,6 |

| | | |
|----|--------------------------------------|-------|
| 7. | Files & Regular Expression in Python | 3,4,6 |
| 8. | Exception Handling in Python | 3,4,5 |
| 9. | Building Desktop Application | 2,3,4 |

P P Savani University
School of Engineering

Department of Science and Humanities

Course Code: SESH1130

Course Name: Experimental Physics

Prerequisite Course(s): --

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 03 | 02 | 00 | 04 | 40 | 60 | 40 | 60 | 00 | 00 | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Prepare students for career in engineering where physics principles can be applied for the advancement of technology.
- Think in core concept of engineering application by studying various topics involved in branch specific application.

Course Content:

| Section I | | | |
|------------|---|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1 | QUANTUM PHYSICS (Prerequisites: Dual nature of radiation, Photoelectric effect Matter waves, wave nature of particles, de-Broglie relation, Davisson-Germer experiment). Introduction; De Broglie hypothesis of matter waves; Properties of matter waves; Phase velocity and group velocity and their relation; Heisenberg uncertainty principle; non-existence of electron in nucleus; Wave function; Physical interpretation of wave function; Schrodinger's time dependent wave equation; time independent wave equation; Quantum Computing (overview). | 07 | 16 |
| 2 | Acoustic and Ultrasonic (Prerequisites: Sound, propagation of sound, concept of frequency and wave length). Acoustic – Introduction, Classification and Characterization of Sound, Sabine's formula for reverberation (without derivation), Absorption Coefficients, Sound Absorbing Materials, factors affecting the acoustics of buildings and remedies, Sound Insulation. Ultrasonic – Introduction, Properties of Ultrasonic, Generation of Ultrasonic sound: Piezoelectric & Magnetostriction effect, Applications of Ultrasonic. | 07 | 16 |
| 3 | LASER AND FIBRE OPTICS (Prerequisites: Absorption, recombination, Valance and conduction bands, refractive index of a material, Snell's law) LASER – Introduction, Characteristics, Absorption, Spontaneous and stimulated emission; metastable state, population inversion, Pumping mechanism, components of LASER; Nd:YAG Laser, Applications of LASER. | 08 | 18 |

| | | | |
|--|--|--|--|
| | FIBRE OPTICS – Introduction, Optical Fiber construction, working principle and types, Numerical Aperture, Acceptance angle and Attenuation, Fiber optic communication system, Applications of Optical Fiber. | | |
|--|--|--|--|

| Section II | | | |
|------------|---|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 4 | NANOSCIENCE AND NANOTECHNOLOGY (Prerequisites: Nano scale and structures, general purpose of nano technology, method of formation of nano structure, fullerenes, carbon nanotubes). Nanomaterials : Properties (Physical, Mechanical, Optical, Electrical, Magnetic); Surface to Volume Ratio; Synthesis of Nanomaterials: Bottom up and Top down technique; Methods to synthesize nanomaterials: PVD & Sol-gel, Applications. | 06 | 14 |
| 5 | SUPERCONDUCTORS AND SUPERCAPACITORS (Prerequisites: Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current, Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical resistivity and conductivity temperature dependence of resistance). Superconductors: Introduction, Critical temperature, Properties of superconductors, Type of superconductors: Type I and Type II and high T _c superconductors, Applications: Magnets, Josephson effect, SQUID, Maglev, other. Supercapacitors: Principle, construction, materials and applications, comparison with capacitor and batteries : Energy density, Power density. | 08 | 18 |
| 6 | SEMICONDUCTOR PHYSICS AND TECHNOLOGY (Prerequisites: Intrinsic and extrinsic semiconductors, Energy bands in conductors, semiconductors and insulators, Semiconductor diode, I-V characteristics in forward and reverse bias) Direct & indirect band gap semiconductor; Fermi level; Fermi energy level in intrinsic & extrinsic semiconductors; effect of impurity concentration and temperature on fermi level; mobility, current density; Hall Effect; Fermi Level diagram for p-n junction (unbiased, forward bias, reverse bias); Applications of semiconductors: LED, Zener diode, Photovoltaic cell. | 09 | 18 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|---------|---|-------|
| 1. | Analysis of errors. | 04 |
| 2. | To measure diameter of a small spherical body using Vernier calipers and hence find its volume. | 04 |
| 3. | To measure the diameter of given object using micrometer screw gauge. | 04 |
| 4. | Verify ohm's law using ammeter and voltmeter. | 04 |
| 5. | To study the series and parallel connections of resistors. | 02 |
| 6. | To study the series and parallel connections of capacitors. | 02 |
| 7. | I-V characteristics of Light Emitting diode (LED). | 02 |
| 8. | I-V characteristics of Zener diode. | 04 |
| 9. | To determine Numerical aperture and acceptance angle of an optical fiber. | 04 |

Text Book(s):

| Title | Author/s | Publication |
|--|---|--------------------------------|
| Concept of the Modern Physics | A. Beiser | Tata McGraw-Hill Education |
| Basic electrical engineering | Kothari and Nagrath | Tata McGraw-Hill Education |
| Quantum Mechanics | P.M. Mathew, K. Venkatesan | Tata McGraw-Hill Education |
| Waves and Acoustics | Pradipkumar Chakrabarti Satyabrata Chawdhary | New Central Book Agency |
| Lasers and Nonlinear Optics | G.D. Baruah | Pragati Prakashan |
| Engineering Physics | G Vijayakumari | Vikas Publishing house PVT LTD |
| Basic Electronics for Scientists and Engineers | Dennis L. Eggleston | Cambridge University Press |

Web Material Link(s):

- <http://nptel.ac.in/course.php>

Course Evaluation:**Theory:**

- Continuous Evaluation consists of two tests each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination will consist of 60 marks.

Practical:

- Continuous Evaluation consists of Performance and regular manual writing, checking of the practical throughout the semester.
- Internal viva or practical performance consist of 20 Marks.
- Practical performance/test of 30 marks during End Semester Exam.
- Viva/Oral performance of 30 marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

| SESH1130 | EXPERIMENTAL PHYSICS |
|----------|---|
| CO 1 | Understand the framework of quantum mechanics and apply the knowledge of basic quantum mechanics to construct one dimensional Schrodinger's wave equation. |
| CO 2 | Classify the phenomenon of acoustics and ultrasonic in various engineering field and apply it for various engineering and medical fields. |
| CO 3 | Describe the laser and articulate the idea of optical fiber communications and apply the concepts of lasers and optical fiber communications in every possible sector. |
| CO 4 | Interpret the concept of Nanotechnology and understand the synthesis and applications of Nanomaterials from technological prospect. Discover the types and properties of Superconductors. Relate the behavior of superconductors at high temperatures |
| CO 5 | Distinguish pure, impure semiconductors and characteristics of semiconductor devices. Thus, will be able to use basic concepts to analyze and design a wide range of semiconductor devices. |

Level of Bloom's Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|-----------|---------|-----------|
|-----------|---------|-----------|

| | | |
|---|--------------------------------------|--------|
| 1 | Quantum Physics | 2 |
| 2 | Acoustic and Ultrasonic | 3 |
| 3 | Laser and Fibre Optics | 2,3 |
| 4 | Nanoscience and Nanotechnology | 2,3,6 |
| 5 | Superconductors and Supercapacitors | 1, 2,3 |
| 6 | Semiconductor Physics and Technology | 1,6 |

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH1120

Course Name: Linear Algebra

Prerequisite Course/s: -- Algebra, Geometry, Trigonometry & Pre-Calculus till 12th Standard level

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 03 | - | 02 | 05 | 40 | 60 | - | - | 100 | - | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Analyses and solve system of linear equations and understand characteristics of Matrices.
- Learn about and work with vector space, linear transformation and inner product space.
- Apply concepts of linear algebra for solving science and engineering problems.
- Introduce the concept of improper integral and Beta-Gamma Function.

Course Content:

| Section I | | | |
|------------|---|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1 | Matrix Algebra Elementary Row and Column operations, Inverse of matrix, Rank of matrix, System of Linear Equations, Characteristic Equation, Eigen values and Eigen vector, Diagonalization, Cayley Hamilton Theorem. | 12 | 30 |
| 2 | Vector Space Concept of vector space, Subspace, Linear Combination, Linear Dependence and Independence, Span, Basis and Dimension, Row Space, Column Space and Null Space, Rank and Nullity. | 11 | 20 |
| Section II | | | |
| Module No. | Content | Hours | Weightage in % |
| 3 | Linear Transformation Introduction of Linear Transformation, Kernal and Range, Rank and Nullity, Inverse of Linear Transformation, Rank Nullity Theorem, Composition of Linear Maps. | 09 | 20 |
| 4 | Inner Product Space Inner Product, Angle and Orthogonality, Orthogonal projection, Gram-Schmidt process and QR Decomposition, least square decomposition. | 08 | 20 |
| 5 | Beta and Gamma function Improper Integrals, Convergence, Properties of Beta and Gamma Function, Duplication Formula (without proof) | 05 | 10 |
| | TOTAL | 45 | 100 |

List of Tutorial:

| Sr. No. | Name of Tutorial | Hours |
|---------|---------------------------|-----------|
| 1. | Matrix Algebra-1 | 04 |
| 2. | Matrix Algebra-2 | 02 |
| 3. | Vector Space-1 | 04 |
| 4. | Vector Space-2 | 02 |
| 5. | Linear Transformation-1 | 04 |
| 6. | Linear Transformation-2 | 02 |
| 7. | Inner Product Space-1 | 04 |
| 8. | Inner Product Space-2 | 02 |
| 9. | Beta and Gamma function-1 | 04 |
| 10. | Beta and Gamma function-2 | 02 |
| | TOTAL | 30 |

Text Book(s):

| Title | Author/s | Publication |
|---------------------------|---|-------------|
| Thomas' Calculus | George B. Thomas, Maurice D. Weir and Joel Hass | Pearson |
| Elementary Linear Algebra | Howard Anton and Chris Rorres | Wiley |

Reference Book(s):

| Title | Author(s) | Publication |
|--|-------------------------------|-------------------|
| Advanced Engineering Mathematics | E Kreyszig | John Wiley & Sons |
| A textbook of Engineering Mathematics | N P Bali and Manish Goyal | Laxmi |
| Higher Engineering Mathematics | B S Grewal | Khanna |
| Engineering Mathematics for First Year | T Veerarajan | Tata Mc Graw Hill |
| Engineering Mathematics-1 (Calculus) | H. K. Dass and Dr. Rama Verma | S. Chand |

Course Evaluation:**Theory:**

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

- Continuous evaluation consists of performance of tutorial which will be evaluated out of 10 Marks for each tutorial and average of the same will be converted to 50 marks.
- Continuous Evaluation consists of self-performance assignment to 20 marks.
- Internal Viva consists of 30 marks.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

| SESH1120 | LINEAR ALGEBRA & CALCULUS |
|----------|--|
| CO 1 | Evaluate linear system using matrices and the knowledge of eigenvalues and eigenvectors for matrix diagonalization |
| CO 2 | Determine the basis and dimension of vector spaces and subspaces. |
| CO 3 | Discuss the matrix representation of a linear transformation given bases of the relevant vector space. |

| | |
|------|---|
| CO 4 | Apply vectors, inner products, and linear transformations to real world situations. |
| CO 5 | Classify gamma, beta functions & their relation which is helpful to evaluate some definite integral arising in various branch of engineering. |

Mapping of CO with PO

| SESH1120 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 3 | 3 | 1 | 1 | | | | | | | | 3 |
| CO 2 | 3 | 2 | 1 | | | | | | | | | 2 |
| CO 3 | 2 | 2 | 1 | | | | | | | | | 3 |
| CO 4 | 2 | 2 | 1 | 1 | | | | | | | | 1 |
| CO 5 | 2 | 1 | 1 | | | | | | | | | 1 |

Mapping of CO with PSO

| SESH1120 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 3 | 2 | |
| CO 2 | 1 | 1 | |
| CO 3 | 2 | 2 | |
| CO 4 | 2 | 2 | |
| CO 5 | | | |

Level of Bloom's Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|-----------|-------------------------|------------------|
| 1 | Matrix Algebra | 1, 2, 3, 4, 5, 6 |
| 2 | Vector Space | 1, 2, 3, 4, 6 |
| 3 | Linear Transformation | 1, 2, 3, 4, 6 |
| 4 | Inner Product Space | 1, 2, 3, 4, 5, 6 |
| 5 | Beta and Gamma Function | 1, 2, 3, 4, 5 |

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV1210
Course Name: Basics of Civil Engineering
Prerequisite Course/s: -

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 3 | 0 | 2 | 5 | 40 | 60 | 00 | 00 | 100 | 0 | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective of the Course:

To help learners to

- Understand components of building, building terminology and construction materials.
- Understand building layout plan.
- Understand latest trends in civil engineering.
- Understand importance of various construction equipment.

Course Content:

| Section I | | | |
|------------|---|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1. | CIVIL ENGINEERING: AN OVERVIEW Introduction, Branches, Scope, Impact, Role of Civil Engineer, Unit of measurement, Unit conversion (Length, Area, Volume). | 04 | 10 |
| 2. | INTRODUCTION TO CIVIL ENGINEERING MATERIALS: List of materials, Details (types, properties, uses) of materials: Cement, Aggregate, Brick, Steel, Concrete, Stone, Soil, Mortar, Timber, Plastic, Epoxy, Flyash, Steel slag, Copper slag, Bitumen, Optical fiber, Pipe, Wire, Cable, Smart material, Basic hand fill tests. | 08 | 12 |
| 3. | BUILDING CONSTRUCTION: Types of building, Components of building, Type of foundation and importance, Types of brick bonds, Principle of planning, Typical building layout, Symbols used in electrical layout, Symbols used for water supply, plumbing and sanitation. Nominal dimensions for door, window and furniture | 10 | 20 |
| Section II | | | |
| Module | Content | Hours | Weightage |
| 4. | INTRODUCTION TO TOWN PLANNING: 5Principles of town planning, Necessity of town planning, Origin of town, Growth of town, Land use, Principles and objects of zoning, Advantages of zoning, Low cost housing, Prevention of slum, FSI. | 04 | 10 |
| 5. | INTRODUCTION TO SURVEYING AND LEVELLING: Introduction: Fundamental principles, Classification. Linear measurement: Instruments used, Chaining on plane ground, Offset, Ranging. Angular measurement: Compass-Instrument used, Meridian, | 10 | 20 |

| | | | |
|----|--|----|----|
| | Bearing, Local attraction. Levelling: Instrument used, Terminology, Types of leveling, Methods of leveling. Modern tools: Introduction to theodolite, Total Station, GPS. | | |
| 6. | CONSTRUCTION EQUIPMENT: Types of equipment- Functions, Uses. Hauling equipment- Truck, Dumper, Trailer. Hoisting equipment- Pulley, Crane, Jack, Winch, Sheave block, Fork truck. Pneumatic equipment- Compressor. Conveying equipment- package, screw, flight/scrap, bucket, belt conveyor. Drill, Tractor, Ripper, Rim pull, Dredger, Drag line, Power shovel, JCB, Hoe. | 04 | 10 |
| 7. | RECENT TRENDS IN CIVIL ENGINEERING: Mass Transportation, Rapid Transportation, Smart City, Sky scraper, Dams, Rain Water harvesting, Batch mix plant, Ready Mix Concrete plant, Green building, Earth quake resisting building. | 05 | 10 |

List of Tutorial :

| Sr. No | Name of Practical | Hours |
|--------|--|-------|
| 1. | Unit conversation Exercise. | 02 |
| 2. | Chart preparation of various materials. | 02 |
| 3. | Different types of brick bonds. | 04 |
| 4. | Layout of residential building. | 02 |
| 5. | Introduction Linear and angular measurements | 02 |
| 6. | Introduction to Theodolite | 04 |
| 7. | Introduction to Dumpy level. | 02 |
| 8. | Introduction to total station. | 04 |
| 9. | Videos showing working of construction Equipments. | 04 |
| 10. | Presentation on various topics as in module 7 about recent trends. | 04 |
| | TOTAL | 30 |

Text Book(s):

| Title | Author/s | Publication |
|-------------------------------|------------------|------------------------|
| Elements of civil engineering | Anurag A. Kandya | Charotar Publication |
| Basic Civil Engineering | S. Ramamrutham | Dhanpatrai Publication |

Reference Book(s):

| Title | Author/s | Publication |
|-------------------------------|------------------------------------|----------------------------------|
| Elements of civil engineering | Dr. R. K. Jain and Dr. P. P. Lodha | McGraw Hill Education |
| Basics of civil engineering | S.S. Bhavikatti | New age international Publishers |

Web Material Links:

- <http://nptel.ac.in/courses/105107122/>
- <http://nptel.ac.in/courses/105107157/>
- <http://nptel.ac.in/courses/105101087/>
- <http://nptel.ac.in/courses/105104100/>

Course Evaluation:

Theory:

- Continuous evaluation consists of two tests each of 15 marks and 1 hour of duration.
- Submission of assignment which consists of solving 20 numerical and it carried 10 marks of evaluation.
- End semester examination will consist of 60 marks exam.

Tutorial:

- Continuous Evaluation consists of performance of practical which should be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 100 marks.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

| SECV1210 | BASICS OF CIVIL ENGINEERING |
|-----------------|--|
| CO 1 | Understand the basics of civil engineering, including its branches, scope, roles, and unit conversions. |
| CO 2 | Identify and explain the properties, types, and uses of various civil engineering materials. |
| CO 3 | Analyze and apply principles of building construction, including building components, foundations, and planning. |
| CO 4 | Demonstrate knowledge of surveying, levelling, modern tools, and recent trends in civil engineering. |

Mapping of CO with PO

| SECV1210 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| CO 1 | 3 | 2 | 1 | | | 2 | 2 | | | | | 1 |
| CO 2 | 3 | 3 | 2 | 1 | | 1 | 2 | | | | | |
| CO 3 | 3 | 2 | 3 | | | 3 | 3 | | 1 | | 1 | |
| CO 4 | 3 | 2 | 1 | | 3 | 2 | 3 | | | | | 3 |

Mapping of CO with PSO

| SECV1210 | PSO1 | PSO2 | PSO3 |
|-----------------|-------------|-------------|-------------|
| CO 1 | 2 | 2 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 3 | 2 | 2 |
| CO 4 | 3 | 2 | 2 |

Level of Bloom's Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|------------------|---|------------------|
| 1 | Civil engineering: An overview | 1, 2, 3 |
| 2 | Introduction to civil engineering materials | 1, 2 |
| 3 | Building construction | 1, 2 |
| 4 | Introduction to surveying and levelling | 1, 2 |
| 5 | Introduction to town planning | 1, 2, 3 |
| 6 | Construction equipment | 1, 2 |
| 7 | Recent trends in civil engineering | 1, 2, 4 |

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE1210

Course Name: Programming with C Essentials

Prerequisite Course(s): --

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 3 | 2 | 0 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the basic components of a computer system.
- identify an appropriate approach to computational problems.
- develop logic building and problem-solving skills.

Course Content:

| Section I | | | | |
|------------|--|-------|----------------|--|
| Module No. | Content | Hours | Weightage in % | |
| 1. | Introduction to Computers Programming: Introduction to programs, its significance, classification of programming language, Selection of a programming language, Flow Charts and Algorithms. | 04 | 10 | |
| 2. | Introduction to Constants, Variables and Data Types: Features of C Language, the Structure of C Program, Types of Errors, Debugging, Tracing the Execution of the Program, Watching Variables Values in Memory. Character Set, C Tokens, Keyword and Identifiers, Constants and Variables, Data Types - Declaration and Initialization, User Define Type Declarations - Typedef, Enum, Basic Input, and Output Operations, Symbolic Constants, Overflow and Underflow of Data. | 07 | 15 | |
| 3. | Operators, Expressions, and Managing I/O Operations: Introduction to Operators and its Types, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity. Introduction to Reading a Character, Writing a Character, Formatted Input and Output. | 05 | 10 | |
| 4. | Conditional Statements: Decision Making & Branching: Decision Making with If and If - else Statements, Nesting of If-else Statements, The Switch and go-to statements, Ternary (?:) Operator. Looping: The while Statement, The Break Statement & The Do. While loop, The FOR loop, Jump within loops - Programs. | 06 | 15 | |
| Section II | | | | |
| Module No. | Content | Hours | Weightage in % | |
| 5. | Arrays: Introduction, One-dimensional Arrays, Two-dimensional Arrays, Concept of Multidimensional Arrays. | 06 | 15 | |
| 6. | Strings: Declaring and Initializing String Variables, Arithmetic Operations on | 05 | 12 | |

| | | | |
|--------------|--|----|-----|
| | Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions. | | |
| 7. | User-Defined Functions: Concepts of User-defined Functions, Prototypes, function Definition, Parameters, Parameter Passing, Calling a Function, Recursive Function. | 06 | 13 |
| 8. | Pointers: Introduction to Pointers, Declaration and initialization of pointers, Pointer to pointer, pointer and array, pointer to array, array to pointer, function returning pointer. | 06 | 10 |
| TOTAL | | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|--------------|--|-------|
| 1. | Draw Flow Chart and write algorithm for at least five problems. | 02 |
| 2. | Introduction to C programming environment, compiler, Linker, loader, and editor. | 02 |
| 3. | Write programs to implement basic elements of C programming (different input functions, different output functions, different data types, and different operators) | 04 |
| 4. | Write programs to implement control structures (if statement, if-else statement, nested if-else statement, switch statement, break statement, goto statement) | 04 |
| 5. | Write programs to implement looping constructs (for loop, while loop, do-while and nested for loop) | 04 |
| 6. | Write programs to implement arrays. (1-D array, and 2-D array) | 04 |
| 7. | Write programs to implement strings. (input, output, different string inbuilt functions) | 02 |
| 8. | Write programs to implement user-defined functions. (function with/without return type, function with/without argument, function and array) | 04 |
| 9. | Write programs to implement recursive function. | 02 |
| 10. | Write programs to implement pointers. | 02 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|----------------------------------|---------------------------------|-------------------|
| Programming in ANSI C | E. Balagurusamy | Tata McGraw Hill |
| Introduction to Computer Science | ITL Education Solutions Limited | Pearson Education |

Reference Book(s):

| Title | Author(s) | Publication |
|-------------------------------|-----------------------|-------------------------|
| Programming in C | Ashok Kamthane | Pearson |
| Let Us C | Yashavant P. Kanetkar | Tata McGraw Hill |
| Introduction to C Programming | ReemaThareja | Oxford Higher Education |
| Programming with C | Byron Gottfried | Tata McGraw Hill |

Web Material Link(s):

- <http://www.digimat.in/nptel/courses/video/106104128/L01.html>
- <https://www.youtube.com/watch?v=3QiltmIWmOM>

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.

- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of practical performance which should be evaluated out of 10 for each practical and average of the same will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Exam.
- Viva-voce consists of 30 marks during End Semester Exam.

Course Outcome(s):

After completion of the course, the students will be able to

| SECE1210 | PROGRAMMING WITH C ESSENTIALS |
|----------|--|
| CO 1 | Observe and interpret the concepts for data representation, algorithms and coding methods in computer system. |
| CO 2 | Immediately analyze the syntax and semantics of the "c" language and apply in program. |
| CO 3 | Manage the less memory usage while developing the program. |
| CO 4 | Classify the types of errors occur while running the program. |
| CO 5 | Develop and utilize user-defined functions, arrays, strings and pointers in C for efficient data manipulation and code modularity. |

Mapping of CO with PO

| SECE1210 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 3 | 3 | 1 | 1 | | | | | | | | 1 |
| CO 2 | 3 | 2 | 1 | | | | | | | | | 1 |
| CO 3 | 3 | 2 | 1 | 1 | | | | | | | | |
| CO 4 | 3 | 2 | 1 | | | | | | | | | 1 |
| CO 5 | 3 | 3 | 1 | | 1 | | | | | | | 1 |

Mapping of CO with PSO

| SECE1210 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 3 | | |
| CO 2 | 1 | 1 | |
| CO 3 | 1 | 2 | |
| CO 4 | 2 | 1 | |
| CO 5 | 2 | 2 | |

Level of Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|-----------|--|-----------|
| 1. | Introduction to Computers Programming: | 1,2 |
| 2. | Introduction to C, Constants, Variables and Data Types | 1,2,3 |
| 3. | Operators, Expressions, and Managing I/O Operations | 3,4 |
| 4. | Conditional Statements | 2,3,4 |
| 5. | Arrays | 2,3,5 |
| 6. | Strings | 2,3 |
| 7. | User-Defined Functions | 2,3,4,6 |

| | | |
|----|----------|---------|
| 8. | Pointers | 2,3,4,5 |
|----|----------|---------|

P P Savani University
School of Engineering

Department of Science and Humanities

Course Code: SEEC1210

Course Name: Basics of Electrical and Electronics

Prerequisite Course(s): --

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 03 | 02 | 00 | 04 | 40 | 60 | 40 | 60 | 00 | 00 | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Understand fundamental concepts of electrical related to Voltage, Current etc. and principles of circuit analysis.
- Explore electrical components, learn measurement and instrumentation along with elementary understanding of electronics.

Course Content:

| Section I | | | |
|------------|--|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1 | Basic Introduction to Electricity and Magnetism Concept of Charge, Coulomb's law, Electric Field, Intensity of electric field, Electric lines of force, Properties of electric lines of force, Electric flux, Flux density, Potential Difference and Current, Concept of Magnetic field, Coulomb's law of magnetic force, Magnetic Lines of Force, Magnetic flux. | 11 | 24 |
| 2 | DC Circuits and Electromagnetism Electrical circuit elements (R, L and C): Resistor, capacitor, Inductor, Voltage and Current sources, Ohm's law, effect of Temperature on resistance, temperature coefficient, Series and parallel combinations of Resistors and capacitors, Kirchoff's current and voltage laws, Thevenin and Norton Theorems. Ampere's law, Lenz and Faraday's laws for electromagnetic induction, Self inductance, Mutual inductance. Examples | 12 | 26 |
| Section II | | | |
| Module No. | Content | Hours | Weightage in % |
| 1 | AC Circuits Representation of sinusoidal waveforms, peak and RMS values, Phasor representation of AC quantities, real power, reactive power, apparent power, power factor, Three phase balanced circuits, voltage and current relations in star and delta connections, Power measurement in three phase circuits. Examples | 11 | 25 |
| 2 | Electronics Classification of Solids: Energy levels in solids, Semiconductors, Intrinsic and Extrinsic Semiconductor, N-type & P-type | 11 | 25 |

| | | | |
|--|---|--|--|
| | semiconductors, P-N junction diode, Characteristics of P-N junction diode, Types of Diodes: Photo diode, Light Emitting Diode, Solar cell, PIN diode, Varactor diode, Zener diode, Advantages of Semiconductor Devices. | | |
|--|---|--|--|

List of Practical:

| Sr. No. | Name of Practical | Hours |
|---------|---|-----------|
| 1. | To understand various electronic devices/components. | 04 |
| 2. | To understand various tools (devices and equipments) used in electrical and electronic circuits for measurements. | 04 |
| 3. | To study cathode ray oscilloscope and to understand how to take measurement, time period and frequency. | 02 |
| 4. | To verify ohm's law using ammeter and voltmeter. | 02 |
| 5. | To study the series and parallel connections of resistors. | 04 |
| 6. | To study the series and parallel connections of capacitors. | 04 |
| 7. | To verify Kirchoff's Current and Voltage Law. | 02 |
| 8. | To study I-V characteristics of Light Emitting diode (LED). | 02 |
| 9. | To study I-V characteristics of Zener diode. | 02 |
| 10. | To understand Faraday's law of electromagnetic induction. | 04 |
| | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|--|---------------------------------|---|
| Basic electrical engineering | T.N. Nagsarkar and M.S. Sukhija | Oxford University Press, 3 rd edition. |
| Basic electrical engineering | D.P. Kothari and I.J. Nagrath | Tata McGraw-Hill Education, 2010 |
| Fundamentals of Electrical Engineering | L. S. Bobrow | Oxford University Press, 2011 |
| Electronic Principles | Albert Malvino & David J. Bates | McGraw-Hill Education, 7 th edition. |
| Electronic Devices and Circuits | David A. Bell | Oxford University Press, 5 th edition |

Web Material Link(s):

- <https://archive.nptel.ac.in/courses/108/105/108105112/>
- <https://archive.nptel.ac.in/courses/108/101/108101091/>

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination will consist of 60 marks.

Practical:

- Continuous Evaluation consists of Performance and regular manual writing, checking of the practical throughout the semester consists 20 Marks.
- Internal viva or practical performance consist of 20 Marks.
- Practical performance/test of 30 marks during End Semester Exam.
- Viva/Oral performance of 30 marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

| | |
|-----------------|--|
| SEEC1210 | BASICS OF ELECTRICAL AND ELECTRONICS |
| CO 1 | Understand basic concepts of electricity and magnetism. |
| CO 2 | Understand and apply fundamental electrical laws and circuit theorems to electrical circuits. |
| CO 3 | Analyze the sinusoidal waveform, single phase and three phase AC circuits. |
| CO 4 | Distinguish pure, impure semiconductors and characteristics of semiconductor devices; will be able to analyze diodes and diode circuits. |

Level of Bloom's Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|-----------|---|-----------|
| 1 | Basic Introduction to Electricity and Magnetism | 1,2 |
| 2 | DC Circuits and Electromagnetism | 2,3,4,5 |
| 3 | AC Circuits | 2,3,4,5 |
| 4 | Electronics | 3,4,5 |

**P P Savani University
School of Engineering**

Department of Mechanical Engineering

Course Code: SEME1220

Course Name: Engineering Workshop

Prerequisite Course(s): --

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| - | 02 | - | 02 | - | - | 40 | 60 | - | - | 100 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- learn about the safety measures required to be taken while using working in workshop.
- learn about how to select the appropriate tools required for specific operation.
- learn about different manufacturing technique for production out of the given raw material.
- understand applications of machine tools, hand tools, power tools and welding process.

List of Practical:

| Sr. No | Name of Practical | Hours |
|--------------|--|-----------|
| 1. | Introduction and Demonstration of Safety Norms. Different Measuring Instruments. | 02 |
| 2. | To Perform a Job of Fitting Shop. | 06 |
| 3. | To Perform a Job of Carpentry Shop. | 06 |
| 4. | To Perform a Job of Sheet Metal Shop. | 06 |
| 5. | To Perform a Job of Black Smithy Shop. | 04 |
| 6. | Introduction and Demonstration of Grinding & Hacksaw Cutting Machine. | 02 |
| 7. | Introduction and Demonstration of Plumbing Shop & Welding Process. | 04 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author(s) | Publication |
|--|-----------------------|------------------------------|
| Elements of Workshop Technology Vol. I | Hajra Chaudhary S. K. | Media promoters & Publishers |
| Workshop Technology Vol. I and II | Raghuvanshi B.S. | Dhanpat Rai & Sons |

Reference Book(s):

| Title | Author(s) | Publication |
|--|----------------|---------------------------|
| Workshop Technology Vol. I | W.A.J. Chapman | Edward Donald Publication |
| Workshop Practices | H S Bawa | Tata McGraw-Hill |
| Basic Machine Shop Practice Vol. I, II | Tejwani V. K. | Tata McGraw-Hill |

Web Material Link(s):

- <http://nptel.ac.in/course.php>

Course Evaluation:**Practical:**

- Continuous Evaluation Consist of Performance of Practical which will be evaluated out of 10 for each practical/Tutorial and average of the same will be converted to 30 Marks.
- Internal Viva consists of 40 Marks.
- External Viva consists of 60 Marks

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

| SEME1220 | ENGINEERING WORKSHOP |
|----------|--|
| CO 1 | Understand the various measuring instruments. |
| CO 2 | Understand the safety norms required in the workshop. |
| CO 3 | Understand the application of various tools required for different operations. |
| CO 4 | Remember the process of manufacture from a given raw material. |
| CO 5 | Explain various manufacturing processes in machine shop. |

Mapping of CO with PO

| SEME1220 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 2 | | | | | 2 | | | 2 | | 1 | 2 |
| CO 2 | | | | | | 3 | | 3 | 3 | | 1 | 3 |
| CO 3 | 2 | | | | | 2 | | | 1 | | 1 | 3 |
| CO 4 | 2 | | | | | | | | 3 | | 2 | 3 |
| CO 5 | 2 | | | | | | | | 3 | | 2 | 3 |

Mapping of CO with PSO

| SEME1220 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 3 | 2 |
| CO 2 | | | |
| CO 3 | 2 | 3 | 2 |
| CO 4 | 3 | 3 | 3 |
| CO 5 | 3 | 3 | 3 |

Level of Bloom's Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Practical No | Content | RBT Level |
|--------------|---|-----------|
| 1 | Introduction and Demonstration of Safety Norms. Different Measuring | 1, 2, 4 |
| 2 | Instruments. | 1, 2, 3 |
| 3 | To Perform a Job of Fitting Shop. | 1, 2, 3 |
| 4 | To Perform a Job of Carpentry Shop. | 2, 3, 4 |
| 5 | To Perform a Job of Sheet Metal Shop. | 2, 3, 4 |
| 6 | To Perform a Job of Black Smithy Shop. | 2, 3, 4 |
| 7 | Introduction and Demonstration of Grinding & Hacksaw Cutting Machine. | 2, 3, 4 |

P P Savani University

School of Engineering

Department of Computer Engineering

Course Code: SECE1220

Course Name: Digital Proficiency

Prerequisite Course(s): --

Teaching & Examination Scheme:

| Teaching Scheme (Hours/Week) | | | | Examination Scheme (Marks) | | | | | | |
|------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | CE | ESE | CE | ESE | CE | ESE | |
| 3 | 0 | 0 | 3 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- provide foundational knowledge of digital tools and technologies.
- introduce the principles of digital communication, collaboration, and problem-solving.
- enhance awareness of emerging digital trends and their applications in engineering.

Course Content:

| Course Content | | | | |
|----------------|--|-------|----------------|--|
| Section I | | | | |
| Module No. | Content | Hours | Weightage in % | |
| 1. | Introduction to Digital Literacy Overview of digital tools and their applications, Introduction to operating systems (Windows, Linux), Basics of file management and cloud storage solutions, Digital communication tools: Email, messaging platforms, and video conferencing tools (Zoom, Teams). | 06 | 13 | |
| 2. | Office Productivity Tools Word Processing: Document formatting, templates, and styles (MS Word/Google Docs). Presentation Tools: Slide design, animations (MS PowerPoint/Google Slides). | 04 | 10 | |
| 3. | Data Handling and Analysis Spreadsheets: Data entry, formulas, charts, pivot tables (MS Excel/Google Sheets). Introduction to data visualization tools (e.g., Tableau, Power BI, Google Data Studio). Applications of data analysis in engineering contexts. AI features in Excel and Google Sheets for predictive analysis. | 07 | 15 | |
| 4. | Computational Problem-Solving Introduction to algorithms and flowcharts. Solving simple engineering problems through programming. Applications of computational techniques in various engineering domains. | 06 | 12 | |
| Section II | | | | |
| Module No. | Content | Hours | Weightage in % | |
| 5. | Cybersecurity and Ethical Practices Understanding cybersecurity principles, Awareness of phishing, malware, and secure passwords, Digital footprints and privacy concerns, Ethical use of technology and copyright considerations. | 05 | 12 | |
| 6. | Introduction to AI Tools and Applications Overview of AI, Machine Learning, and their applications in engineering. Practical use of AI tools: ChatGPT for content creation and brainstorming, Canva for design and visual communication, GitHub Copilot for coding assistance. Ethical considerations in AI usage. | 07 | 15 | |
| 7. | Emerging Technologies and Industry Trends Overview of Industry 4.0 concepts: IoT, AI, Robotics, and Blockchain. Applications of emerging technologies in various engineering domains. Case studies: Smart cities, sustainable manufacturing, and automation. Preparing for future technological trends and job roles. | 07 | 15 | |
| 8. | Capstone Project and Case Study Group project: Solve a practical engineering problem using digital | 03 | 08 | |

| | | | |
|--------------|---|----|-----|
| | tools. Case study presentations on the application of digital and AI tools in real-world scenarios. | | |
| TOTAL | | 45 | 100 |

Text Book(s):

| Title | Author/s | Publication |
|--|---|----------------------|
| Digital Literacy for Dummies | Faithe Wempen | Wiley |
| Literacy in a Digital World: The Evolution and Development of Literacy Proficiency | Lorraine Dagostino, Jennifer Bauer, Michael Deasy, Ed.D., Kathleen Ryan | Rowman & Littlefield |

Reference Book(s):

| Title | Author(s) | Publication |
|---|----------------------------------|---------------------------------------|
| Computer Fundamentals | P.K. Sinha and Priti Sinha | BPB Publications- 6th Edition |
| Microsoft Office 365: In Practice | Randy Nordell and Annette Easton | McGraw Hill Education- Latest Edition |
| Ethics for the Information Age | Michael J. Quinn | Pearson Education- 8th Edition |
| Industry 4.0: Managing the Digital Transformation | Alp Ustundag and Emre Cevikcan | Springer |

Web Material Link(s):

- <https://learn.microsoft.com/en-us/training/browse/>
- <https://www.ibm.com/think/topics/cybersecurity>
- https://www.youtube.com/playlist?list=PLIKpQrBME6xLGL3Ty_1Wbd3nTZ_q_OKFQ

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

After completion of the course, the students will be able to

| SECE1220 | Digital Proficiency |
|----------|---|
| CO 1 | Demonstrate proficiency in using digital tools, operating systems, and cloud platforms for effective communication and collaboration. |
| CO 2 | Create, edit, and manage professional documents, presentations, and spreadsheets using modern office productivity software. |
| CO 3 | Analyze and visualize data using advanced spreadsheet features and data visualization tools to solve engineering problems. |
| CO 4 | Identify cybersecurity risks, implement ethical practices, and safeguard digital assets in professional environments. |
| CO 5 | Apply AI tools and understand emerging technologies like IoT and blockchain to address real-world engineering challenges. |

Mapping of CO with PO

| SECE1220 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 3 | 3 | | 1 | 3 | | | | 2 | 3 | | 1 |
| CO 2 | 3 | 2 | | | 3 | | | | | 3 | | 1 |
| CO 3 | 3 | 2 | 1 | 3 | 3 | | | | | | | 1 |

| | | | | | | | | | | | | |
|------|---|---|---|--|---|---|--|---|--|--|---|---|
| CO 4 | 3 | 2 | | | | 3 | | 3 | | | | 1 |
| CO 5 | 3 | 3 | 1 | | 3 | | | | | | 3 | 1 |

Mapping of CO with PSO

| SECE1220 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 3 | 3 | 1 |
| CO 2 | 2 | 2 | |
| CO 3 | 3 | 2 | 1 |
| CO 4 | 2 | 3 | 1 |
| CO 5 | 3 | 2 | 3 |

Level of Revised Bloom's Taxonomy in Assessment

| | | |
|-------------|---------------|-----------|
| 1: Remember | 2: Understand | 3: Apply |
| 4: Analyze | 5: Evaluate | 6: Create |

| Module No | Content | RBT Level |
|-----------|---|-----------|
| 1. | Introduction to Digital Literacy | 1,2,3 |
| 2. | Office Productivity Tools | 2,3,4 |
| 3. | Data Handling and Analysis | 2,3,4,5 |
| 4. | Computational Problem-Solving | 2,3 |
| 5. | Cybersecurity and Ethical Practices | 1,2,3 |
| 6. | Introduction to AI Tools and Applications | 1,2,3,5 |
| 7. | Emerging Technologies and Industry Trends | 3,4,5 |
| 8. | Capstone Project and Case Study | 2,3,5,6 |