



PPSU

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

**B. TECH.
COMPUTER SCIENCE & ENGINEERING - CYBER SECURITY**

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 | <p>Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.</p> |
| PO 2 | <p>Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first-principles of mathematics, natural sciences and engineering sciences.</p> |
| PO 3 | <p>Design/Development of Solutions: Design solutions for complex engineering problems and design system-components or processes that meet specified needs with appropriate consideration for public health & safety, cultural, societal and environmental considerations.</p> |
| PO 4 | <p>Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis & interpretation of data, and synthesis of information to provide valid conclusions for complex problems.</p> |
| PO 5 | <p>Engineering Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering & IT tools including prediction and modelling to engineering activities, with an understanding of their limitations.</p> |
| PO 6 | <p>The Engineer and The World: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice; understand the impact of engineering solutions in societal and environmental contexts, and demonstrate knowledge of, and need for, sustainable development.</p> |
| PO 7 | <p>Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.</p> |
| PO 8 | <p>Individual and Collaborative Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.</p> |
| PO 9 | <p>Communication: Communicate effectively on engineering activities with the engineering community and with society at large—such as being able to write reports, design documentation, make effective presentations and give/receive instructions.</p> |
| PO 10 | <p>Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's work, as a member or leader in a team in a multidisciplinary environment to manage projects.</p> |
| PO 11 | <p>Life-Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</p> |

| PSO No | PROGRAMME SPECIFIC OUTCOMES (PSO) COMPUTER SCIENCE & ENGINEERING - CYBER SECURITY |
|--------|--|
| PSO 1 | Develop expertise in utilizing contemporary tools and technologies in cybersecurity to identify, analyze and mitigate threats, ensuring data integrity, confidentiality and availability of digital assets and systems. |
| PSO 2 | Design and implement secure information systems and policies, applying principles of cryptography, network security, and risk management to solve real-world cybersecurity challenges and enhance the security posture across various sectors. |
| PSO 3 | Prepare technically competent employee, researcher, entrepreneur, and excel in competitive exams, and increase passion for higher studies. |

| 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. (Computer Science & Engineering - Cyber Security)

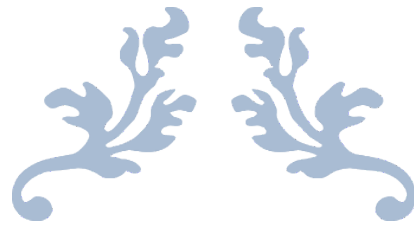


P P Savani University
School of Engineering

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. COMPUTER SCIENCE & ENGINEERING – CYBER SECURITY 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 | 40 | 60 | 200 |
| | SEIT1210 | Python for Engineers | IT | 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 | 100 | 0 | 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 | 40 | 60 | 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 | 100 | 00 | 0 | 0 | 100 |
| SECE1220 | Digital Proficiency | CE | 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 | 40 | 60 | 200 |
| | SEIT1210 | Python for Engineers | IT | 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 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |
| | | | | | | | Total | 23 | 21 | | | | | | |
| 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 | 40 | 60 | 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 | 100 | 00 | 0 | 0 | 100 |
| | SECE1220 | Digital Proficiency | CE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| | | | | | | | Total | 25 | 23 | | | | | | |

**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:

| 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 |
| 4. | Partial Derivatives Function of several variables, Partial differentiation, Applications, Chain rule, Linear approximations, Maxima and Minima, Euler's theorem, Lagrange multiplier. | 11 | 30 |
| 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 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 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 | | | 1 |
| CO 2 | 1 | 1 | 2 |
| CO 3 | | 1 | 1 |
| CO 4 | 1 | 2 | 2 |
| CO 5 | 1 | 2 | 3 |

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 | - | - | 40 | 60 | 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:

| 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 |
| 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 Tutorials:

| Sr. No. | Name of Tutorials | 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 | 04 |
| 5. | To understand construction and working 2 -stroke & 4 -stroke Diesel Engines | 04 |
| 6. | To understand the types of hardness test | 04 |
| 7. | To understand the stress-strain curve for ductile and brittle material | 04 |
| 8. | To understand the basic concept of metacentric height | 02 |
| 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 40 marks.
- External Practical viva consists of 60 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. |
| CO 5 | Analyze mechanical properties of materials and apply concepts of stress-strain relationships and elasticity in engineering problems. |

Mapping of CO with PO

| SEME1210 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 2 | 3 | 1 | 3 | 2 | 2 | | | | | 2 |
| CO 2 | 2 | 3 | 1 | 3 | 2 | 2 | | | | | 2 |
| CO 3 | 1 | 3 | 1 | 3 | 2 | 2 | | | | | 2 |
| CO 4 | 1 | 3 | 1 | 3 | 2 | 2 | | | | | 2 |
| CO 5 | 1 | 3 | 1 | 1 | 2 | 2 | | | | | 2 |

Mapping of CO with PSO

| SEME1210 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 1 | | 1 |
| CO 2 | | | 1 |
| CO 3 | | 1 | 1 |
| CO 4 | | 1 | 1 |
| CO 5 | | 1 | 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:

| 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 |

| | | | |
|--------------|--|----|-----|
| 6. | Python Object Oriented Programming OOP Concept of Class, Object and Instances, Constructor, Class, 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. | 08 | 16 |
| 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. |
| CO 5 | Design object-oriented and GUI-based Python applications. |

Mapping of CO with PO

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

Mapping of CO with PSO

| SEIT1210 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 3 | 2 | 2 |
| CO 5 | 3 | 3 | 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 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) | | | Credit | Examination Scheme (Marks) | | | | | | |
|---------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | | 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:

| 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; Wave function; Physical interpretation of wave function; Phase velocity and group velocity and their relation; Heisenberg uncertainty principle; non-existence of electron in nucleus; 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, | 09 | 18 |

| | | | |
|---|--|----|-----|
| | Pumping mechanism, components of LASER; Nd:YAG Laser, Applications of LASER, Interference, Diffraction, Diffraction grating. FIBRE OPTICS – Introduction, Optical Fiber construction, working principle and types, Numerical Aperture, Acceptance angle and Attenuation, Fiber optic communication system, Applications of Optical Fiber. | | |
| 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 (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. | 07 | 18 |
| 6 | SEMICONDUCTORS (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; Classification of Conductors, Semiconductors and Insulators on the basis of energy band, Intrinsic & Extrinsic Semiconductors, Diodes, p-n junction (unbiased, forward bias, reverse bias); Applications of semiconductors: LED, Zener diode, Photovoltaic cell, Advantages of Semiconductor Devices, Transistors (working and characteristics) | 09 | 18 |
| | TOTAL | 45 | 100 |

List of Practical:

| Sr. No | Name of Practical | Hours |
|--------|---|-------|
| 1. | To understand some basic aspects of the graph drawing. | 04 |
| 2. | To understand some basic aspects of error analysis. | 02 |
| 3. | To study the series and parallel connections of resistors. | 02 |
| 4. | To study the series and parallel connections of capacitors. | 04 |
| 5. | To study the energy band gap of semiconductor materials of a P-N junction of diode. | 02 |
| 6. | To study the I-V characteristic of LED and dynamic resistance of a given LED. | 02 |
| 7. | To study the I-V characteristic of ZENER diode and measurement of dynamic resistance. | 02 |
| 8. | To determine the Numerical Aperture and acceptance angle of an optical fiber | 04 |
| 9. | To determine wavelength of laser using diffraction grating. | 04 |
| | TOTAL | 30 |

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. |

Mapping of CO with PO

| SESH1130 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|

| | | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| CO 2 | 2 | 3 | 2 | 3 | 2 | 1 | 1 | 0 | 1 | 1 | 2 |
| CO 3 | 2 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 1 | 2 | 2 |
| CO 4 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 3 |
| CO 5 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 2 |

Mapping of CO with PSO

| SESH1130 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | | | 1 |
| CO 2 | | | 1 |
| CO 3 | 1 | 1 | 2 |
| CO 4 | | | 1 |
| CO 5 | 1 | 1 | 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 | 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:

| 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 |
| 3 | Linear Transformation Introduction of Linear Transformation, Kernel 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 |
|----------|--|
| 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 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 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 | 1 | 1 | 2 |
| CO 2 | | | 1 |
| CO 3 | 1 | 1 | 2 |
| CO 4 | 1 | 1 | 2 |
| CO 5 | | | 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 | 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 | 40 | 60 | 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:

| 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 |
| 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, Bearing, Local attraction. | 10 | 20 |

| | | | |
|----|--|----|----|
| | 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 scrapper, 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. | Videoshowing 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 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 practical which should be evaluated out of 10 marks for each practical and average of the same will be converted to 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:

| SECV1210 | BASICS OF CIVIL ENGINEERING |
|----------|---|
| CO 1 | Explain the fundamental concepts of civil engineering, including its branches, scope, roles, and basic unit conversions. |
| CO 2 | Identify and describe the properties, types, and applications of common civil engineering materials such as cement, concrete, steel, and aggregates. |
| CO 3 | Illustrate and apply principles of building construction, including components, foundations, brick bonds, and building planning/layout. |
| CO 4 | Demonstrate basic knowledge and applications of surveying and levelling techniques, including modern instruments like total station and GPS. |
| CO 5 | Explain concepts of town planning, construction equipment, and recent trends in civil engineering such as smart cities, green buildings, and sustainable practices. |

Mapping of CO with PO

| SECV1210 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 3 | 2 | 2 | 3 | 2 | 3 | | 2 | | 3 | |
| CO 2 | 3 | 3 | 3 | | 2 | | 2 | 3 | 3 | | 3 |
| CO 3 | 3 | 2 | 2 | 2 | 3 | 3 | | 2 | 2 | 1 | |
| CO 4 | 3 | 3 | | 3 | | 2 | 3 | | 2 | 3 | |
| CO 5 | 3 | | 3 | 2 | 2 | 1 | 2 | 3 | | | |

Mapping of CO with PSO

| SECV1210 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | | | 1 |
| CO 2 | | | 1 |
| CO 3 | | | 1 |
| CO 4 | 1 | | 2 |
| CO 5 | | 1 | 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:

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

Mapping of CO with PSO

| SECE1210 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 1 | 1 | 2 |
| CO 3 | 3 | 2 | 2 |
| CO 4 | 3 | 2 | 2 |
| CO 5 | 3 | 3 | 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 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) | | | Credit | Examination Scheme (Marks) | | | | | | |
|---------------------------------|-----------|----------|--------|----------------------------|-----|-----------|-----|----------|-----|-------|
| Theory | Practical | Tutorial | | 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:

| 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 |
| 3 | 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 |
| 4 | Electronics Classification of Solids: Energy levels in solids, Semiconductors, Intrinsic and Extrinsic Semiconductor, N-type & P-type 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 | 11 | 25 |

| | | | |
|--|------------------------|--|--|
| | 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 |
| | Total | 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 completion of the course, the students will be able to

| SEEC1210 | BASICS OF ELECTRICAL AND ELECTRONICS |
|-----------------|--|
| CO 1 | Apply fundamental electrical laws (Ohm's Law, KCL, KVL) to analyze basic electrical circuits with resistors, capacitors, inductors, and sources. |
| CO 2 | Analyze and solve electrical circuits using network theorems such as Thevenin's, Norton's, Superposition, and apply node and mesh analysis techniques. |
| CO 3 | Evaluate the performance of AC and DC circuits by analyzing power components, power factor, transient and steady-state behavior of RLC circuits. |
| CO 4 | Explain the working principles and applications of semiconductor devices including PN junction diode, rectifiers, BJT, JFET, and MOSFET. |
| CO5 | Design and analyze basic digital circuits using number systems, logic gates, Boolean algebra, combinational and sequential circuits. |

Mapping of CO with PO

| SEEC1210 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|
| CO 1 | 3 | 2 | 1 | | | | | | | | |
| CO 2 | 3 | 3 | 2 | 1 | | | | | | | |
| CO 3 | 3 | 2 | 1 | 1 | | | | | | | |
| CO 4 | 2 | 1 | 1 | | | | | | | | |
| CO 5 | 3 | 2 | 3 | 1 | 1 | | | | 1 | | |

Mapping of CO with PSO

| SEEC1210 | PSO1 | PSO2 | PSO3 |
|-----------------|-------------|-------------|-------------|
| CO 1 | | | 1 |
| CO 2 | 1 | 1 | 2 |
| CO 3 | 1 | 1 | 2 |
| CO 4 | 2 | 1 | 2 |
| CO 5 | 3 | 2 | 3 |

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 | - | - | 100 | - | - | - | 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 and average of the same will be converted to 50 Marks.
- Internal Viva consists of 50 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 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 2 | | | | | 2 | | | 2 | | 1 |
| CO 2 | | | | | | 3 | | 3 | 3 | | 1 |
| CO 3 | 2 | | | | | 2 | | | 1 | | 1 |
| CO 4 | 2 | | | | | | | | 3 | | 2 |
| CO 5 | 2 | | | | | | | | 3 | | 2 |

Mapping of CO with PSO

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

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:

| 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 |
| 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 | 07 | 15 |

| | | | |
|--------------|---|----|-----|
| | usage. | | |
| 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 tools. Case study presentations on the application of digital and AI tools in real-world scenarios. | 03 | 08 |
| 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 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 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 | | | | | | 1 |

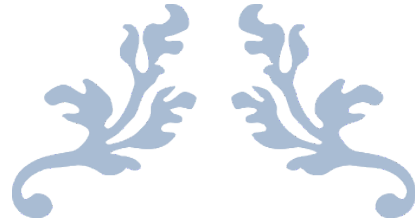
Mapping of CO with PSO

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



SECOND YEAR B. TECH.



P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR SECOND YEAR B.TECH. COMPUTER SCIENCE & ENGINEERING - CYBER SECURITY PROGRAMME AY: 2025-26

| Sem | Course Code | Course Title | Course Category | Offered By | Teaching Scheme | | | | | Examination Scheme | | | | | | |
|-----|-------------|--|-------------------|------------|-----------------|-----------|----------|--------------|-----------|--------------------|-----|-----------|-----|----------|-----|-------------|
| | | | | | Contact Hours | | | | Credit | Theory | | Practical | | Tutorial | | Total |
| | | | | | Theory | Practical | Tutorial | Total | | CE | ESE | CE | ESE | CE | ESE | |
| 3 | SESH2150 | Discrete Structures & Graph Theory | Interdisciplinary | SH | 3 | 0 | 2 | 5 | 5 | 40 | 60 | 0 | 0 | 100 | 0 | 200 |
| | SECE2280 | Database Management System | Major/Core | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SECE2291 | Data Structures | Major/Core | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SEIT2250 | Object Oriented Programming with Java | Major/Core | IT | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SEIT2270 | Web Application Development | Major/Core | CE | 2 | 2 | 0 | 4 | 3 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | CFLS2140 | Upper Intermediate Communicative English | AEC | CFLS | 2 | 0 | 0 | 2 | 2 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |
| | CLSC2020 | IPDC-I | VAC | CLSC | 2 | 0 | 0 | 2 | 2 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |
| | | | | | | | | Total | 28 | 24 | | | | | | 1200 |
| 4 | SESH2170 | Mathematics for Information Security | Interdisciplinary | SH | 2 | 0 | 0 | 2 | 2 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| | SECE2310 | Computer Networks | Major/Core | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SEIT2260 | Operating System | Major/Core | IT | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SECE2260 | Design & Analysis of Algorithms | Major/Core | CE | 3 | 2 | 0 | 5 | 4 | 40 | 60 | 40 | 60 | 0 | 0 | 200 |
| | SECB2500 | MOOC Course-I | Minor | DS | 3 | 0 | 0 | 3 | 3 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |
| | SEEC2080 | Digital Logic Design | Major/Core | EC | 2 | 0 | 0 | 2 | 2 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| | CLSC2030 | IPDC-II | VAC | CLSC | 2 | 0 | 0 | 2 | 2 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |
| | | | | | | | | Total | 24 | 21 | | | | | | 900 |

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH2150

Course Name: Discrete Structures & Graph Theory

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 | 05 | 40 | 60 | -- | -- | 100 | -- | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- extend concepts of set theory by the study of relation and lattice.
- illustrate mathematical logic with various techniques of program verification.
- apply knowledge of discrete mathematics for problem-solving skills necessary to succeed in the design and analysis of algorithms, database management, software engineering, and computer networks.

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|--|-------|----------------|
| 1. | Set, Relation & Function-I Sets, Set operations, Introduction of Relations, Relations of Sets, Types of Relations, Properties of Relations, Equivalence Relation. | 04 | 10 |
| 2. | Set, Relation & Function-II Partial Ordering, Hasse Diagram, GLB & LUB, Functions, Classification of functions, Types of functions | 04 | 07 |
| 3. | Lattices Definition & properties of Lattice, Lattices as Algebraic System, Sublattices, Types of lattices, Distributive lattices, Modular lattices, Complemented lattices, Bounded lattices, Complete lattices, Finite Boolean algebra | 07 | 16 |
| 4. | Group Theory-I Binary operations, Properties of Group, Groupoid, semigroup & monoid, Abelian group, Subgroup. | 04 | 10 |
| 5. | Group Theory-II Cosets, Normal subgroup, Lagrange's theorem, Cyclic group, Permutation group, Homomorphism & Isomorphism of groups. | 04 | 07 |
| 6. | Mathematical Logic and Proof Propositions, logical operators, Algebra of proposition, Predicates & quantifiers, Nested Quantifiers, Rules of Inference, Proof Methods, Program Correctness techniques. | 06 | 14 |
| 7. | Graph Theory Graphs and Graph Models, Graph Terminology and Types of graphs, | 08 | 18 |

| | | | |
|----|--|----|-----|
| | Representing graphs and Isomorphism, Connectivity, Euler and Hamilton Paths-Circuits, Applications of weighted graphs. | | |
| 8. | Tree Introduction to Trees, Rooted Tree, Properties of tree, Binary tree, Tree Traversal, Spanning Tree, DFS, BFS, Minimum Spanning Tree, Prim's Algorithm, Kruskal's Algorithm. | 08 | 18 |
| | TOTAL | 45 | 100 |

List of Tutorial(s):

| Sr. No. | Name of Practical | Hours |
|---------|--|-------|
| 1. | Problems based on Set, Relation & Function-1 | 2 |
| 2. | Problems based on Set, Relation & Function-2 | 2 |
| 3. | Problems based on Set, Relation & Function-3 | 2 |
| 4. | Problems based on Lattices | 4 |
| 5. | Problems based on Group Theory-1 | 4 |
| 6. | Problems based on Group Theory-2 | 4 |
| 7. | Problems based on Mathematical Logic and Proof | 4 |
| 8. | Problems based on Graph Theory-1 | 4 |
| 9. | Problems based on Graph Theory-2 | 2 |
| 10. | Problems based on Tree | 2 |
| | TOTAL | 30 |

Text Book(s):

| Title | Author/s | Publication |
|---|---------------|------------------------|
| Discrete Mathematics and its Applications | Kenneth Rosen | McGraw Hill, New York. |

Reference Book(s):

| Title | Author(s) | Publication |
|---|-------------------------|---|
| A Textbook of Discrete Mathematics | Dr. Swapan Kumar Sarkar | S. Chand & Company Ltd., New Delhi. |
| Discrete Mathematical Structure with Applications to Computer Science | J.P.Trembly, R. Manohar | Tata McGraw-Hill Publishing Company Ltd. New Delhi. |
| Graph Theory with Applications to Engineering and Computer Science | Narsingh Deo | PHI Learning Pvt. Ltd. New Delhi. |

Web Material Link(s):

- <http://nptel.ac.in/courses/111107058/>
- <http://nptel.ac.in/courses/111104026/>

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 the performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 100 marks.

Course Outcome(s):

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

| SESH2150 | DISCRETE STRUCTURES & GRAPH THEORY |
|-----------------|---|
| CO 1 | Summarize the concepts of set theory for understanding & fetching data from a database using query. |
| CO 2 | Construct the algorithm of group theory for data encryption. |
| CO 3 | Combine the design, foundational concepts of notations and results of graph theory used for better understanding of problems. |
| CO 4 | Develop an algorithm using Asymptotic analysis |
| CO 5 | Classify the basic concepts of spanning tree algorithms namely dfa, bfs, prim's and kruskal's in the design of networks. |

Mapping of CO with PO

| SESH2150 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 2 | 2 | 1 | 1 | | | | | | | 1 |
| CO 2 | 2 | 2 | 1 | 1 | | | | | | | 1 |
| CO 3 | 3 | 3 | 1 | 1 | | | | | | | 3 |
| CO 4 | 2 | 2 | 1 | 1 | | | | | | | 2 |
| CO 5 | 3 | 3 | 1 | 1 | | | | | | | 3 |

Mapping of CO with PSO

| SESH2150 | PSO1 | PSO2 | PSO3 |
|-----------------|------|------|------|
| CO 1 | 1 | | 2 |
| CO 2 | 3 | 3 | 3 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 2 | 1 | 2 |
| CO 5 | 2 | 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. | Set, Relation & Function-I | 1,2,4,6 |
| 2. | Set, Relation & Function-II | 1,2,4,6 |
| 3. | Lattices | 1,2,3,4,6 |

| | | |
|----|------------------------------|-----------|
| 4. | Group Theory-I | 1,2,3,5,6 |
| 5. | Group Theory-II | 1,2,3,5,6 |
| 6. | Mathematical Logic and Proof | 1,2,3,4,6 |
| 7. | Graph Theory | 1,2,3,5,6 |
| 8. | Tree | 1,2,3,5,6 |

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE2280

Course Name: Database Management System

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

- learn the basic concept of database design and development of database management system.
- understand Query processing of SQL.
- understand the importance of back-end design and relational database management System (RDBMS).

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|---|-------|----------------|
| 1. | Introduction to DBMS Introduction and applications of DBMS, Purpose of DBMS, File system versus DBMS, Advantages of DBMS, Database System architecture, Database users, DBA | 04 | 10 |
| 2. | Entity-Relationship model Basic concepts, Design process: Attributes, Entity and Relationship, E-R constraints, weak entity sets, extended E-R features: generalization, specialization, aggregation, conversion of E-R diagram into database schema. | 07 | 15 |
| 3. | SQL Concepts-I Basics of SQL, Types of SQL language, Using DDL statements to create and manage tables, defining constraints: primary key, foreign key, unique key, Not null, check, manipulating data using DML statements, retrieving data using SQL select statement, SQL conditions in where clause. | 6 | 13 |
| 4. | SQL Concepts-II SQL Built-in functions: numeric, date, string functions, displaying data from multiple tables using Joins, Aggregate functions with group by and having clause, Subqueries with operators, SQL views, TCL commands: Commit, Rollback, Savepoint, DCL commands: Grant, revoke, query processing steps. | 6 | 12 |
| 5. | Relational Model Structure of relational databases, Domains, Relations, Relational algebra: fundamental operators and syntax, inner join, outer join, relational algebra queries | 05 | 12 |
| 6. | Normalization Functional Dependency: Definition, trivial and non-trivial FD, closure of attributes, closure of FD set, irreducible set of FD, Decomposition using FD, dependency preservation, Database | 07 | 15 |

| | | | |
|--------------|---|----|-----|
| | design anomalies, Normalization: 1NF, 2NF, 3NF, BCNF, Multi-valued dependency, 4NF. | | |
| 7. | Transaction Management Transaction concepts, ACID property of transactions, concurrent executions of transactions and related problems, serializability of transactions, testing for serializability, deadlock, solution to concurrency related problems: Locking mechanism, two-phase locking protocol, System recovery, Log-based recovery, Two-phase commit protocol | 07 | 15 |
| 8. | Basics of PL/SQL Programming structure of PL/SQL, Datatypes, Exception Handling, Cursor, Stored Procedure, Function, Trigger | 03 | 08 |
| TOTAL | | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|--------------|---|-------|
| 1. | Draw E-R Diagram of any management system with the use of any tools. | 02 |
| 2. | Installation of database management system e.g MySQL, ORACLE, etc. | 02 |
| 3. | Introduction to SQL, DDL, DML, DCL, database and table creation, alteration, defining constraints, primary key, foreign key, unique, not null, check. | 06 |
| 4. | Implement different operators and inbuilt SQL functions. | 02 |
| 5. | Implement different types of join operations and relevant features of SQL. | 04 |
| 6. | Implement aggregate functions with group by, having, order by features of SQL. | 04 |
| 7. | Implement the sub-queries and views in SQL. | 04 |
| 8. | Study and use of Transaction control commands, Commit, Rollback, Save point features of SQL. | 02 |
| 9. | Introduction to PL/SQL concepts and implementation of Cursors. | 02 |
| 10. | Study and Implementation of stored procedures, stored function and triggers. | 02 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|--|--|------------------|
| Database System Concept | Abraham Silberschatz, Henry F. Korth, S. Sudarshan | McGraw Hill |
| SQL, PL/SQL-The Programming Language of Oracle | Ivan Bayross | BPB Publications |

Reference Book(s):

| Title | Author(s) | Publication |
|------------------------------------|----------------------------|----------------------|
| Fundamental of Database system | R. Elmasri and S.B Navathe | The Benjamin/Cumming |
| Oracle: The Complete Reference | George Koch, Kevin Loney | TMH /Oracle Press |
| An Introduction to Database system | C J Date | Addition-Wesley |

Web Material Link(s):

- <https://nptel.ac.in/courses/106105175>
- <https://www.youtube.com/watch?v=c5HawKX-suM>

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 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.
- Viva-voce consists of 30 marks.

Course Outcome(s):

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

| SECE2280 | DATABASE MANAGEMENT SYSTEM |
|-----------------|--|
| CO1 | Understand the importance of back-end design and relational database management system. |
| CO2 | Apply physical data, conceptual data and its conversion into relational databases. |
| CO3 | Practice various database constraints on relational databases. |
| CO4 | Design and develop database for the software projects. |
| CO5 | Implement PL/SQL programs using cursors, procedures, functions, and triggers to manage transactions effectively. |

Mapping of CO with PO

| SECE2280 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|
| CO 1 | 3 | 3 | 2 | | 2 | | | | | 1 | |
| CO 2 | 3 | 3 | 2 | | 2 | | | | | | |
| CO 3 | 3 | 3 | 2 | | 2 | | | | | 1 | |
| CO 4 | 3 | 3 | 3 | 2 | 3 | | | | | 2 | 2 |
| CO 5 | 3 | 2 | 3 | 2 | 3 | | | | 2 | 2 | 2 |

Mapping of CO with PSO:

| SECE2280 | PSO1 | PSO2 | PSO3 |
|-----------------|-------------|-------------|-------------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 3 | 3 | 3 |
| CO 5 | 3 | 3 | 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 DBMS | 1,2 |
| 2. | Entity-Relationship model | 1,2,3 |
| 3. | SQL Concepts-I | 4,6 |
| 4. | SQL Concepts-II | 4,6 |
| 5. | Relational Model | 3,4 |

| | | |
|----|------------------------|-------|
| 6. | Normalization | 2,3 |
| 7. | Transaction Management | 2,3,4 |
| 8. | Basic of PL/SQL | 2,4,6 |

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE2291

Course Name: Data Structures

Prerequisite Course(s): Programming with C Essentials (SECE1210)

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 linear and non-linear data structures and its applications.
- analyze various searching and sorting algorithms and its impacts on data structures.
- develop logic building and problem-solving skills.

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|--|-------|----------------|
| 1. | Introduction to Data Structures Basic Terminology, Classification of Data Structures: Primitive and Non-Primitive, Linear and Non-linear, Operations on Data Structures. | 04 | 10 |
| 2. | Array Array Representation, Array as an Abstract Data Type, Programming Array in C, Sparse Matrices, Sparse Representations, and its Advantages, Row-measure Order and Column-measure Order representation. | 04 | 10 |
| 3. | Searching and Sorting Linear Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Radix sort. | 04 | 10 |
| 4. | Stack and Queue Stack Definition and concepts, Operations on stack, Programming Stack using Array in C, Prefix and Postfix Notations and their Compilation, Recursion, Tower of Hanoi, Representation of Queue, Operation on Queue, Programming Queue using Array in C. Types of Queue, Applications of Stack & Queue. | 07 | 15 |
| 5. | Linked List-Part I Dynamic Memory Allocation, Structure in C, Singly Linked List, Doubly Linked List, circular linked list. | 04 | 10 |
| 6. | Linked List-II and Applications of Linked List Linked implementation of Stack, Linked implementation of Queue, Applications of Linked List. | 03 | 08 |
| 7. | Trees and Graphs Tree Definition, concepts, and Representation, Binary Tree, Binary Tree Traversals, conversion from general to Binary Tree. Threaded Binary Tree, Heap, Binary Search Tree. Tree for Huffman coding, AVL Trees. 2-3 Trees, Graph Definition, Concepts, and Representation, Types of Graphs, Breadth First | 15 | 28 |

| | | | |
|----|--|----|-----|
| | Search, Depth First Search, Spanning Tree, Kruskal's and Prim's Minimum Cost Spanning Tree Algorithms, Dijkstra's Shortest Path Algorithm. | | |
| 8. | Hashing The Symbol Table Abstract Data Types, Hash Tables, Hashing Functions, Hash collision Resolution Technique, Linear Probing. | 04 | 10 |
| | TOTAL | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|---------|--|-------|
| 1. | Working with the array. <ul style="list-style-type: none"> Write a program to read numbers and store it in array and display it. Write a program to demonstrate the concept of one-dimensional array Write a program to insert an element in array. Write a program to delete an element from an array. Write a program to add two matrix A and B. Write a program to concatenate two strings. | 04 |
| 2. | Write a program to perform Linear Search. | 02 |
| 3. | Write a program to perform Binary Search. | 02 |
| 4. | Write a program to perform Bubble sort. | 02 |
| 5. | Write a program to perform Selection sort. | 02 |
| 6. | Write a program to perform Insertion sort. | 02 |
| 7. | Write a program to implement a stack and perform push, pop operation. | 02 |
| 8. | Write a program to perform the following operations in a linear queue - Addition, Deletion, and Traversing. | 02 |
| 9. | Write a program to perform the following operations in singly linked list - Creation, Insertion, and Deletion. | 04 |
| 10. | Write a program to create a binary tree and perform - Insertion, Deletion, and Traversal. | 04 |
| 11. | Write a program for traversal of graph (B.F.S., D.F.S.). | 04 |
| | TOTAL | 30 |

Text Book(s):

| Title | Author/s | Publication |
|--|--------------------------------------|------------------|
| An Introduction to Data Structures with Applications | Jean-Paul Tremblay, Paul G. Sorenson | Tata McGraw Hill |

Reference Book(s):

| Title | Author(s) | Publication |
|--|--|----------------------|
| Data Structures using C & C++ | Tanenbaum | Prentice-Hall |
| Fundamentals of Computer Algorithms | E. Horowitz, S. Sahni, and S. Rajsekaran | Galgotia Publication |
| Data Structures: A Pseudo-code approach with C | Gilberg & Forouzan | Thomson Learning |

Web Material Link(s):

<https://nptel.ac.in/courses/106102064/>

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

| SECE2291 | DATA STRUCTURES |
|----------|--|
| CO 1 | Explain and differentiate various data structures, their classifications, and operations for organizing and processing data efficiently. |
| CO 2 | Implement linear data structures such as arrays, stacks, and queues to solve real-world computational problems |
| CO 3 | Apply and analyze dynamic data structures like linked lists, trees, and graphs for efficient data manipulation and traversal. |
| CO 4 | Evaluate and compare the performance of various searching, sorting, and hashing techniques in terms of time and space complexity. |
| CO 5 | Design appropriate data structure-based solutions for specific problems using suitable algorithms and justify the chosen approach. |

Mapping of CO with PO

| SECE2291 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 3 | 2 | | | | | | | | | 1 |
| CO 2 | 3 | 3 | 2 | | 3 | | | 1 | | | |
| CO 3 | 3 | 3 | 2 | 2 | 3 | | | 1 | | | |
| CO 4 | 3 | 3 | | 3 | 3 | | | | | | |
| CO 5 | 2 | 3 | 3 | 2 | 3 | | | 2 | 1 | 1 | 3 |

Mapping of CO with PSO:

| SECE2291 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 3 | 2 | 2 |
| CO 5 | 3 | 3 | 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 Data Structures | 1,2,3 |
| 2. | Array | 1,2,3,4 |
| 3. | Searching and Sorting | 1,2,3,4,5 |
| 4. | Stack and Queue | 1,2,3,4,5 |
| 5. | Linked List-Part I | 1,2,3,4 |

| | | |
|----|--|-------------|
| 6. | Linked List-II and Applications of Linked List | 2,3,4,5 |
| 7. | Trees and Graphs | 1,2,3,4,5,6 |
| 8. | Hashing | 1,2,3,4,5 |

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT2250

Course Name: Object Oriented Programming with Java

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 fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be aware of the important topics and principles of object-oriented software development.
- Be able to use the Java SDK environment to create, debug and run core Java programs.

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|--|-------|----------------|
| 1. | Fundamental of Object-Oriented Programming: History of Java, Basic overview of java, Bytecode, JVM, Buzz-words, Application and applets, Constants, Variables, Data Types, Comments, Operators, Control Flow | 04 | 10 |
| 2. | Class Fundamentals: General form of class, creating class Overloading methods, Constructor, Declaring Object, Returning objects, using objects as parameters, assigning object reference variables, Introducing Access control, understanding static, introducing final, the finalize () method, This keyword, Garbage collection. | 06 | 15 |
| 3. | Array & String Handling: Array basics, String Array, String class, String Buffer class, String Tokenizer Class and Object Class. | 06 | 10 |
| 4. | Inheritance, Interfaces & Packages: Inheritance: Using super creating multilevel Hierarchy, method overriding, Dynamic method dispatch, abstract classes, using final with Inheritance, Using Package: Defining package, finding | 06 | 15 |

| | | | |
|--------------|---|----|-----|
| | package and CLASSPATH, Access protection, importing package, Interface: Defining Interface, Implementing Interface, Variables in Interface. | | |
| 5. | Exceptions Handling: Exception types, Try...Catch...Finally, Throw, Throws, creating your own exception subclasses. | 06 | 15 |
| 6. | Multithreaded Programming: Life cycle of thread, thread methods, thread priority, thread exceptions, Implementing Runnable interface, Synchronization. | 06 | 15 |
| 7. | GUI Programming Swing overview, Swing component classes: AbstractButton, ButtonGroup, ImageIcon, JApplet, JButton, JCheckBox, JComboBox, JLabel, JRadioButton, JScrollPane, JTabbedPane, JTable, JTextField, JTree. Event Handling. | 06 | 10 |
| 8. | JDBC Introduction to java database programming, JDBC driver types, Steps to connect JDBC, JDBC statement interface, JDBC prepared statement interface, JDBC callable statement interface | 05 | 10 |
| TOTAL | | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|--------------|---|-------|
| 1. | Introduction to Java Environment and NetBeans | 02 |
| 2. | Implementation of Java programs with classes and objects | 02 |
| 3. | Implementation of Java programs to create functions, constructors with overloading and overriding | 02 |
| 4. | Implementation of Java programs to demonstrate different access specifiers | 02 |
| 5. | Implementation of Java programs for variables, data types, operators | 02 |
| 6. | Implementation of Java programs to use arrays and string | 02 |
| 7. | Implementation of Java programs for inheritance (single, multilevel, hierarchical) | 02 |
| 8. | Implementation of Java programs to demonstrate the use of super keyword | 02 |
| 9. | Implementation of Java programs for Interface | 02 |
| 10. | Implementation of Java programs to demonstrate Java packages | 02 |
| 11. | Implementation of Java programs for exception handling using all keywords (try, catch, throw, throws and finally) | 02 |
| 12. | Implementation of Java programs to demonstrate the life cycle of thread | 02 |
| 13. | Implementation of Java programs for the concepts of thread priority, synchronization, inter-thread communication | 02 |
| 14. | Implementation of Java Swing programs to Create Registration Form | 02 |
| 15. | Implement Java Database Connectivity using JDBC. | 02 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|-------|----------|-------------|
|-------|----------|-------------|

| | | |
|-----------------------------|-----------------|--|
| Java The Complete Reference | Herbert Schildt | McGraw Hill 13 th Edition Jan 11, 2024 |
|-----------------------------|-----------------|--|

Reference Book(s):

| Title | Author(s) | Publication |
|-----------------------------------|-------------------------------------|----------------|
| Core Java Volume I - Fundamentals | Cay Horstmann and Gray Cornell | Pearson |
| Thinking in Java | Bruce Eckel | Pearson |
| Learning Java | Patrick Niemeyer & Jonathan Knudsen | O'Reilly Media |

Web Material Link(s):

- <https://docs.oracle.com/javase/tutorial/tutorialLearningPaths.html>
- <http://openjdk.java.net/projects/jigsaw/>
- <https://docs.oracle.com/en/java/javase/14/docs/api/index.html>
- <https://netbeans.apache.org/download/index.html>
- <https://download.eclipse.org/eclipse/downloads/>

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

| SEIT2250 | Object Oriented Programming with Java |
|----------|--|
| CO 1 | Implement Object Oriented programming concept using basic syntaxes of control Structures, strings, and function for developing skills of logic building activity. |
| CO 2 | Use of a variety of basic control structures including selection and repetition; classes and objects in a tiered architecture (user interface, controller, and application logic layers) |
| CO 3 | Demonstrates how to achieve reusability using inheritance, interfaces, and packages and describes faster application development that can be achieved. |
| CO 4 | Demonstrate understanding and use of different exception handling mechanisms |

| | |
|------|--|
| | and concepts of multithreading for robust faster and efficient application development. |
| CO 5 | Identify and describe common abstract user interface components to design GUI in Java using Swing along with a response to events. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture |

Mapping of CO with PO

| SEIT2250 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 2 | 3 | 3 | | | | | | | | |
| CO 2 | 3 | 2 | 3 | 2 | 1 | 1 | | | | | |
| CO 3 | | 2 | 2 | 3 | 2 | | | | | | 1 |
| CO 4 | 1 | 1 | 1 | 1 | 3 | | | | | | 2 |
| CO 5 | 1 | 1 | 1 | 2 | 3 | 1 | | 1 | | | 2 |

Mapping of CO with PSO

| SEIT2250 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 3 | 2 | 2 |
| CO 5 | 3 | 3 | 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. | Fundamental of Object-Oriented Programming | 1,2 |
| 2. | Class Fundamentals | 1,2,3 |
| 3. | Array & String Handling | 3,4,5 |
| 4. | Inheritance, Interfaces & Packages | 2,3,4,5 |
| 5. | Exceptions Handling | 2,3,5 |
| 6. | Multithreaded Programming | 2,3,4,6 |
| 7. | GUI Programming | 2,3,4,5,6 |
| 8. | JDBC | 3,4,5,6 |

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT2270

Course Name: Web Application Development

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 | - | 03 | 40 | 60 | 40 | 60 | - | - | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- To provide students with a strong foundation in HTML5, CSS3, and JavaScript for building interactive and responsive web pages.
- To equip students with advanced JavaScript skills (ES6, promises, async/await, modules) for creating dynamic and efficient web applications.
- To enable students to integrate ML/AI models with web interfaces, fetch and display model predictions, and create interactive visualizations.
- To give students practical exposure to simple back-end setups using Node.js or Flask for serving ML models.
- To prepare students to develop, test, and deploy web-based ML/AI applications efficiently.

Course Content:

| Section I | | | |
|------------------|---|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1. | HTML5 Introduction to HTML, Browsers and HTML, Editor's Offline and Online, Tags, Attributes and Elements, Doctype, Comments, Headings, Paragraphs, Lists and Links, Images and Tables. | 05 | 10 |
| 2. | CSS3 & Responsive Design Introduction to CSS, Selectors, Properties and Values, Box Model, Margins, Padding, Borders, Fonts, Colors, Flexbox, Grid, Media Queries | 05 | 15 |
| 3. | JavaScript Basics Data Types, Variables, Operators, Loops, Functions, DOM Manipulation, Events, Form Validation | 05 | 15 |
| 4. | Advanced JavaScript ES6 Features (let, const, arrow functions), Template literals, Destructuring, Spread/Rest operators, Promises, Async/Await, Fetch API, Local Storage, Modules, Error Handling | 05 | 15 |

| | | | |
|--------------|--|----|-----|
| 5. | Displaying ML/AI Outputs on Web Fetching data from APIs, Rendering model predictions, Interactive visualizations with Plotly Dash / Chart.js | 05 | 15 |
| 6. | Simple Back-End for ML Integration Minimal Node.js / Flask setup to serve ML models, Handling requests, Sending predictions to front-end | 05 | 10 |
| TOTAL | | 30 | 100 |

List of Practical:

| Sr No | Name of Practical | Hours |
|--------------|--|-------|
| 1 | Create a web page with headings, paragraphs, lists, links, and images. | 2 |
| 2 | Design a registration form and a table showing sample student data. | 2 |
| 3 | Apply CSS to format text, background, borders, and layout. | 2 |
| 4 | Create a responsive page using Flexbox/Grid and media queries. | 2 |
| 5 | Write JavaScript scripts to change content, style, and attributes dynamically (DOM Manipulation). | 2 |
| 6 | Validate user input in forms (e.g., email, phone number) using JavaScript. | 2 |
| 7 | Create interactive buttons and forms that respond to clicks, mouse events, and key events. | 2 |
| 8 | Implement ES6 features: arrow functions, template literals, destructuring, and spread/rest operators. | 2 |
| 9 | Fetch JSON data from a public API (e.g., weather, COVID stats) and display it dynamically on a web page. | 2 |
| 10 | Store user preferences in local storage (e.g., dark mode toggle) and organize code using JavaScript modules. | 2 |
| 11 | Build a table that can add, edit, and delete rows dynamically using JavaScript. | 2 |
| 12 | Plot sample datasets (e.g., monthly sales, student marks) using Chart.js or Plotly.js. | 2 |
| 13 | Create a simple Flask/Node.js API that returns static JSON data (e.g., product list or student info). | 2 |
| 14 | Consume API data on a web page using JavaScript fetch/AJAX and display it dynamically. | 2 |
| 15 | Deploy a web page with dynamic content or charts on Heroku / GitHub Pages / Netlify. | 2 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|-------------------------------|-------------------------------|-----------------|
| Black Book, Web Technologies, | Kogent Learning Solutions Inc | Dreamtech Press |

Reference Book(s):

| Title | Author/s | Publication |
|-----------------------------|----------------------------------|-----------------|
| Black Book, HTML 5 | DT Editorial Services | Dreamtech Press |
| Developing Web Applications | Ralph Moseley and M. T. Savaliya | Wiley-India |

Web Material Link(s):

- https://www.w3schools.com/whatis/whatis_fullstack.asp
- https://www.youtube.com/watch?v=nu_pCVPKzTk (Free code camp)
- <https://www.javatpoint.com/how-to-be-a-full-stack-developer>
- <https://www.tutorialspoint.com/the-full-stack-web-development/index.asp>

Course Evaluation:**Theory:**

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 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 performance of practical, which should be evaluated out of 10 marks per each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Mini Project Contains of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Exam.
- Viva/Oral performance consists of 30 marks during End Semester Exam.

Course Outcome(s):

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

| SEIT2270 | Web Application Development |
|----------|---|
| CO 1 | Develop structured and responsive web pages using HTML5, CSS3, and JavaScript. |
| CO 2 | Apply advanced JavaScript (ES6, promises, async/await, modules) to create dynamic and efficient web applications. |
| CO 3 | Design web interfaces capable of fetching and displaying dynamic data, and create interactive visualizations. |
| CO 4 | Build and integrate simple back-end services using Node.js or Flask to serve data to web pages. |
| CO 5 | Deploy, test, and maintain web applications efficiently on platforms like Heroku, GitHub Pages, or Netlify. |

Mapping of CO with PO

| SEIT2270 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 2 | 2 | 2 | 1 | 3 | 1 | 1 | | | 2 | 1 | 1 |
| CO 2 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | | | 2 | 1 | 1 |
| CO 3 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | | | 2 | | 2 |
| CO 4 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | | | 2 | 1 | 1 |
| CO 5 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | | | 2 | 1 | 1 |

Mapping of CO with PSO

| SEIT2270 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 3 | 3 | 3 |
| CO 5 | 2 | 2 | 3 |

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 | HTML5 | 1, 2,3 |
| 2 | CSS3 & Responsive Design | 1, 2,3 |
| 3 | JavaScript Basics | 1, 3,4 |
| 4 | Advanced JavaScript | 2, 3,4,6 |
| 5 | Displaying ML/AI Outputs on Web | 2, 3,6 |
| 6 | Simple Back-End for ML Integration | 3,5,6 |

**P P Savani University
School of Engineering**

Department of Science & Humanities

Course Code: SESH2170

Course Name: Mathematics for Information Security

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

- recall existing knowledge of calculus and apply it for solving engineering problems involving differential equations.
- introduce partial differential equations with different methods of solution.
- introduce core concepts of statistics and probability to enable students to analyze, interpret, and summarize data effectively.
- familiarize students with correlation, regression, and curve fitting methods for data prediction and model approximation using the least squares technique.
- apply probability distributions to real-life and engineering decision-making problems.
- define and distinguish between the properties of a binary relations reflexive, symmetric, and transitive.

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|---|-------|----------------|
| 1. | Differential Equations First order ODEs, Formation of differential equations, Solution of differential equation, Solution of equations in separable form, Exact first order ODEs, Linear first order ODEs, Bernoulli Equation, definition of Partial differential equation. | 7 | 20 |
| 2. | Basics of Statistics Mean, Median, Mode, Percentile, Quartile, Measure of variability, Range, Interquartile Range, Variance, Standard Deviation, Coefficient of Variation. | 5 | 15 |
| 3. | Correlation & Regression Analysis Regression Analysis, Regression line and regression coefficient, Karl Pearson's method. | 4 | 15 |
| 4. | Basic Probability Experiment, Assigning Probabilities, Events and their Probabilities, definition of probability, conditional probability, independent events, Bayes' rule | 4 | 15 |
| 5. | Probability Distributions Random variables (discrete and continuous), Binomial probability distribution, Poisson probability distribution and normal distributions- problems. | 6 | 20 |
| 6. | Curve Fitting Curve fitting by of method of least squares, fitting of straight lines, second degree parabola and more general curves. | 4 | 15 |

| | | |
|--------------|----|-----|
| TOTAL | 30 | 100 |
|--------------|----|-----|

Text Book(s):

| Title | Author/s | Publication |
|--|---|--|
| Advanced Engineering Mathematics | Erwin Kreyszig | Wiley India Pvt. Ltd. New Delhi. |
| Probability and Statistics for Engineers | Richard A. Johnson Irwin Miller, John Freund | Pearson India Education Services Pvt. Ltd., Noida. |

Reference Book(s):

| Title | Author(s) | Publication |
|------------------------------------|--------------------------------|-------------------------------------|
| Higher Engineering Mathematics | B. S. Grewal | Khanna Publishers, New Delhi |
| Advanced Engineering Mathematics | R. K. Jain S.R.K. Iyengar | Narosa Publishing House New Delhi. |
| Differential Equations for Dummies | Steven Holzner | Wiley India Pvt. Ltd., New Delhi. |
| Higher Engineering Mathematics | H.K. Dass Er. Rajnish Verma | S. Chand & Company Ltd., New Delhi. |

Web Material Link(s):

- <http://nptel.ac.in/courses/111105035/>
- <http://nptel.ac.in/courses/111106100/>
- <http://nptel.ac.in/courses/111105093/>
- <http://nptel.ac.in/courses/111108081/>
- <http://nptel.ac.in/courses/111105041/1>
- <http://nptel.ac.in/courses/122104019/>

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

| SESH2160 | Mathematics for Information Security |
|----------|--|
| CO 1 | Apply fundamental concepts and methods to form and solve first- and higher-order Ordinary Differential Equations (ODEs) arising in engineering and applied sciences. |
| CO 2 | Formulate and solve Ordinary Differential Equations using standard methods to model physical and engineering problems. |
| CO 3 | Apply statistical techniques for data organization, analysis, and interpretation, including measures of central tendency, dispersion, correlation, and regression. |
| CO 4 | Demonstrate understanding of basic probability concepts and probability distributions (Binomial, Poisson, and Normal) to model uncertain situations. |
| CO 5 | Apply the method of least squares for curve fitting of straight lines, parabolas, and other polynomial models, and evaluate model accuracy using statistical measures. |

Mapping of CO with PO

| | | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| SESH2170 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|

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

Mapping of CO with PSO

| SESH2170 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | | | 1 |
| CO 2 | 1 | 1 | 2 |
| CO 3 | 2 | 1 | 2 |
| CO 4 | 2 | 1 | 2 |
| CO 5 | 2 | 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. | Differential Equations | 1, 2, 3, 5 |
| 2. | Basics of Statistics | 1, 2, 3, 4, 5 |
| 3. | Correlation & Regression Analysis | 1, 2, 3, 4, 5 |
| 4. | Basic Probability | 1, 2, 3, 4, 5 |
| 5. | Probability Distributions | 1, 2, 3, 4, 5 |
| 6. | Curve Fitting | 1, 2, 3, 4, 5 |

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE2310

Course Name: Computer Networks

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 communication network design.
- understand state-of-the-art in network protocols, architectures.
- learn to develop an understanding of different components of computer networks, various protocols, technologies and their applications.

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|---|-------|----------------|
| 1. | Introduction to Data Communication and Networking Overview of Data Communication and Networking Components of a Data Communication System Types of Networks (LAN, MAN, WAN, Internet), Network Topologies | 04 | 10 |
| 2. | Network Models and Standards Protocol Hierarchies and Layer Design Issues Interfaces and Services OSI Reference Model – Layers and Functions TCP/IP Reference Model – Comparison with OSI Model Network Devices and Standards Organizations | 07 | 15 |
| 3. | Physical Layer Transmission Media (Guided & Unguided) Data and Signal Transmission Concepts Asynchronous and Synchronous Transmission Multiplexing Techniques (FDM, TDM, WDM), Switching Techniques | 04 | 10 |
| 4. | Data Link Layer Layer design issues, services provided to network layers, Framing, Error Detection, and Correction Techniques, Flow control, Data link control protocols – Simplex protocol, sliding window protocol, Utopia, Stop N Wait, Automatic Repeat Request. Go Back N, Selective Repeat Protocols. | 07 | 15 |
| 5. | Medium Access Sub Layer Channel Allocations, Multiple Access protocols- ALOHA, CSMA, CSMA/CD protocols, Collision-free protocols, Limited contention protocols, LAN architectures, IEEE 802 and OSI, Ethernet (CSMA/CD), Bus, Token Ring, DQDB, FDDI, Bridges and recent developments. | 07 | 15 |

| | | | |
|--------------|---|----|-----|
| 6. | Network Layer A network Layer design issue, Routing algorithms, and protocols – OSPF, BGP, RIP, Congestion Control Algorithms, Internetworking – IPV4 & IPV6, Addressing, N/W Layer Protocols, and subnets. | 08 | 15 |
| 7. | Transport Layer Transport services, Design issues, transport layer protocols – TCP & UDP, Congestion Control, QOS and its improvement. | 04 | 10 |
| 8. | Application Layer Client-Server Model, WWW, HTTP, DNS, DHCP, FTP, and Email Protocol – IMAP, POP3, SMTP | 04 | 10 |
| TOTAL | | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|--------------|--|-------|
| 1. | To study and prepare LAN cables (cross and straight) using crimping tool, to configure LAN. | 02 |
| 2. | To study and Physical examine different network device and their usage. | 02 |
| 3. | Configure switch and router in small network and identify the difference. | 02 |
| 4. | To Study of network IP – IPV4 & IPV6. | 02 |
| 5. | Configure Network Topology using Cisco Packet tracer. | 04 |
| 6. | To monitor network traffic using Wire Shark | 02 |
| 7. | To get the MAC or Physical Address of the system Using Address Resolution Protocol. | 02 |
| 8. | To Configure network using Routing Information Protocol (RIP) | 04 |
| 9. | To configure network state routing protocol (OSPF). | 02 |
| 10. | To configure Border Gateway Protocol. | 02 |
| 11. | To configure Application Layer protocols: DHCP and DNS and understand its functionality in Wireshark/ Packet tracer. | 02 |
| 12. | Understand functionality of TCP & UDP using Wireshark/ Packet Tracer. | 02 |
| 13. | Understand functionality of HTTP & FTP using Wireshark/ Packet Tracer. | 02 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|-----------------------------------|---------------------|------------------|
| Data Communication and Networking | Behrouz A. Forouzan | Tata McGraw Hill |

Reference Book(s):

| Title | Author(s) | Publication |
|--------------------------------------|----------------------------------|-----------------|
| Computer Networks | Andrew S Tanenbaum | PHI Learning |
| Data and Computer Communications | William Stallings | Prentice Hall |
| TCP/IP Illustrated Volume-I | Kevin R. Fall, W.Richard Stevens | Addition Wesley |
| Internetworking with TCP/IP Volume-I | Douglas E. Comer | PHI |

Web Material Link(s):

- <https://www.udemy.com/new-2016-networking-fundamentals-for-beginners/>
- <https://www.cisco.com/c/en in/training-events/training-certifications/certifications.html>
- http://www.tutorialspoint.com/computer_fundamentals/computer_networking.html
- <https://nptel.ac.in/courses/106105080/>

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

| SECE2310 | COMPUTER NETWORKS |
|----------|---|
| CO 1 | Illustrate the foundational concepts of data communication, network devices, topologies, and protocol layering in computer networks. |
| CO 2 | Analyze the functions and design issues of the physical and data link layers, including transmission techniques, error detection, and flow control methods. |
| CO 3 | Apply medium access control protocols and LAN technologies to solve channel allocation and collision management problems. |
| CO 4 | Compare and evaluate routing, addressing, and congestion control algorithms used in the network and transport layers |
| CO 5 | Design and integrate network applications using common application layer protocols such as HTTP, DNS, DHCP, FTP, and Email systems. |

Mapping of CO with PO

| SECE2310 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 2 | 1 | 1 | 1 | 2 | | 2 | | | 3 | |
| CO 2 | 3 | 1 | 1 | 2 | 1 | | 3 | 1 | | | 3 |
| CO 3 | 2 | 2 | 2 | | 1 | | 3 | | 1 | 2 | |
| CO 4 | | 2 | 2 | 1 | 1 | 2 | 2 | | | 2 | |
| CO 5 | 3 | 2 | 3 | 2 | 3 | | | 1 | 2 | 3 | 2 |

Mapping of CO with PSO

| SECE2310 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 3 | 3 | 3 |
| CO 5 | 3 | 3 | 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 Data Communication and Networking | 2,4 |
| 2. | Network Models and Standards | 2,4 |
| 3. | Physical Layer | 1,2,4 |
| 4. | Datalink Layer | 2,4 |
| 5. | Medium Access Layer | 1,2 |
| 6. | Network Layer | 2,3,5,6 |
| 7. | Transport Layer | 2,4 |
| 8. | Application Layer | 2,5 |

P P Savani University
School of Engineering

Department of Information Technology Engineering

Course Code: SEIT2260

Course Name: Operating System

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

- provide a fundamental understanding of the operating system functions, architecture, services, and interconnections among services within operating systems.

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|--|-------|----------------|
| 1. | Introduction to Operating System Basics of Operating System: Definition, Types of Operating System, Operating System Structure, Operating System Services, Concept of Virtualization. | 03 | 07 |
| 2. | Processes and Threads Management Concept of Process: Definition, Process State, Process State Transition, Process Control Block, CPU Scheduling: CPU-I/O Burst Cycle, Types of Schedulers, Context Switching | 03 | 07 |
| 3. | CPU Scheduling Algorithms & Multithreading Preemptive and Non- Preemptive Scheduling, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Priority, Round Robin, Multilevel Queue, Lottery Scheduling; Threads, Types of Threads, Multithreading | 06 | 13 |
| 4. | Inter Process Communication Race Conditions, Critical Regions, Mutual Exclusion with Busy Waiting, Sleep and Wakeup, Semaphores, Mutexes, Monitors, Message Passing, Classical IPC Problems: The Dining Philosopher Problem, The Readers and Writers Problem | 07 | 15 |
| 5. | Deadlocks Resources, Conditions for Deadlocks, Deadlock Modelling, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention. | 04 | 08 |
| 6. | Memory Management - I Main memory: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging: Introduction to Paging, Translation look-aside buffer (TLB), Structure of Page Table | 05 | 12 |
| 7. | Memory Management - II Virtual Memory, Demand Paging, Page Replacement Algorithms: FIFO, Optimal, LRU, NRU, Second Chance, Thrashing | 06 | 13 |
| 8. | File & Disk Management File Types, File Attributes, Access Methods, Operations, Directories, | 11 | 25 |

| | | | |
|--------------|---|----|-----|
| | Allocation Methods: Contiguous, Linked, Indexed; Disk Structure, Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK; Disk Space Management, RAID Levels | | |
| TOTAL | | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|--------------|---|-------|
| 1. | Study of basic commands of Linux. | 02 |
| 2. | Study of Advance commands and filters of Linux/UNIX. | 02 |
| 3. | Write shell scripts to perform several computations like add numbers, subtract numbers, find average, percentage. Also find factorial of a given number. Generate Fibonacci series etc. | 04 |
| 4. | Simulate any two CPU scheduling algorithms. (E.g. FCFS, SJF, Round Robin etc.) | 04 |
| 5. | Simulate any two contiguous memory allocation techniques. (E.g. Worst-fit, Best-fit, Next-fit, First-fit) | 04 |
| 6. | Simulate banker's algorithm for deadlock avoidance. | 04 |
| 7. | Simulate any two page replacement algorithms. (E.g. FIFO, LRU, Optimal) | 04 |
| 8. | Simulate any two disk scheduling algorithms. (E.g. FCFS,SCAN,C-SCAN) | 04 |
| 9. | Case studies: OS in Industries, Protection and Role-based Access Controls of OS. | 02 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|-------------------------|---------------------|-------------|
| Modern Operating System | Andrew S. Tanenbaum | Pearson |

Reference Book(s):

| Title | Author(s) | Publication |
|--|---|------------------|
| Operating Systems: Internals and Design Principles | William Stallings | Pearson |
| UNIX and Shell Programming | Behrouz A. Forouzan, Richard F. Gilberg | Cengage Learning |
| Operating Systems | Dhamdhare D. M | Tata McGraw Hill |

Web Material Link(s):

<https://nptel.ac.in/courses/106106144>

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 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 performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, average of the entire practical 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/Oral performance consists of 30 Marks during End Semester Exam.

Course Outcome(s):

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

| SEIT2260 | OPERATING SYSTEM |
|-----------------|--|
| CO 1 | Understand the basic principles of operating system. |
| CO 2 | Illustrate the concepts of operating systems services and its components. |
| CO 3 | Evaluate the performance of operating system algorithms and achieve a comprehensive understanding of memory management during process execution. |
| CO 4 | Comprehend how an operating system manages file systems, mass storage, and I/O operations. |
| CO5 | Understand process synchronization, deadlocks, and OS security. |

Mapping of CO with PO

| SEIT2260 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|
| CO 1 | 3 | 2 | 1 | | | | 1 | | | 1 | |
| CO 2 | 2 | 2 | 2 | 1 | 2 | | | | | 2 | |
| CO 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 1 | | 2 | |
| CO 4 | 3 | 3 | 3 | 2 | 3 | 1 | | 1 | 2 | 3 | 2 |
| CO5 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 2 | 1 | 2 | 2 |

Mapping of CO with PSO

| SEIT2260 | PSO1 | PSO2 | PSO3 |
|-----------------|-------------|-------------|-------------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 3 | 2 | 2 |
| CO 4 | 2 | 2 | 3 |
| CO 5 | 3 | 3 | 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 Operating System | 1, 2, 4 |
| 2. | Processes and Threads Management | 1, 2, 3 |
| 3. | CPU Scheduling Algorithms & Multithreading | 2, 3, 4, 5 |
| 4. | Inter Process Communication | 2, 3, 4, 5 |
| 5. | Deadlock | 2, 3, 4, 6 |
| 6. | Memory Management - I | 1, 2, 3 |
| 7. | Memory Management - II | 1, 2, 3, 4, 6 |
| 8. | File & Disk Management | 1, 2, 3, 4, 5 |

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2260

Course Name: Design & Analysis of Algorithms

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 | 0 | 0 | 200 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- develop logic building and problem-solving skills.
- understand how to calculate time complexity and space complexity of any algorithm.
- demonstrate and teach various methods for performance analysis of different types of algorithms.
- compare major algorithmic design techniques and demonstrate their application using suitable examples.

Course Content:

| Module No. | Content | Hours | Weightage in % |
|------------|--|-------|----------------|
| 1. | Introduction to Algorithm Design and Analysis Definition of the Algorithm, Characteristics of algorithms, Types of algorithm designs technique, Recursive Algorithms, Need of Analysis for the efficient algorithm, Asymptotic Notations, Analyzing control statement and Loop invariant, Analysis of different algorithms for best, worst and average case: sequential search, bubble sort, insertion sort, selection sort, heap sort | 06 | 15 |
| 2. | Divide and Conquer Algorithmic Design Method Divide and conquer: basic algorithm and characteristics, Recurrence and different methods to solve recurrence, Binary Search: method and analysis of binary search for best, worst and average case for searches, Quick Sort, Merge Sort: method and analysis of algorithms, Finding the largest and smallest number in a list, Matrix Multiplication. | 06 | 15 |
| 3. | Greedy Method The Greedy Method: basic algorithm and characteristics, Problem solving using Greedy technique- Fractional Knapsack Problem, Optimal merge patterns, Job sequencing with deadlines, Huffman Coding, Minimum cost spanning trees: Prim's and Kruskal's Algorithm, Single source shortest path. | 06 | 10 |

| | | | |
|--------------|---|----|-----|
| 4. | Backtracking and Branch and Bound technique Backtracking Method: basic algorithm and characteristics, Problem solving using Backtracking technique- N-Queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycle (TSP). | 05 | 10 |
| 5. | Dynamic Programming Method Dynamic Programming Method: basic algorithm and characteristics, Problem solving using Dynamic Programming technique- 0/1 Knapsack Problem, Making Change Problem, Multistage graphs, Optimal binary search trees, Travelling salesperson problem. | 07 | 15 |
| 6. | Branch and Bound technique Branch and bound: basic algorithm and characteristics, FIFO Branch and Bound & Least Cost Branch & Bound, Problem solving using Branch and Bound technique- N-Queens using branch & bound, Least Cost Search, 15-puzzle, Solving Travelling salesperson problem. | 07 | 15 |
| 7. | String Matching Introduction, The naive string-matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata, The Knuth-Morris-Pratt algorithm. | 04 | 12 |
| 8. | Introduction to NP-Completeness Definition of P and NP classes, Relation between complexity classes, Examples of problems in various classes. | 04 | 08 |
| TOTAL | | 45 | 100 |

List of Practical:

| Sr. No. | Name of Practical | Hours |
|--------------|--|-------|
| 1. | Implementation and Time analysis of Bubble sort. | 02 |
| 2. | Implementation and Time analysis of Selection sort. | 02 |
| 3. | Implementation and Time analysis of Insertion sort. | 02 |
| 4. | Implementation and Time analysis of binary search algorithm. | 02 |
| 5. | Implementation and Time analysis of Merge sort. | 02 |
| 6. | Implementation and Time analysis of Quick sort. | 02 |
| 7. | Implementation of Fractional Knapsack Problem. | 02 |
| 8. | Implementation of Minimum Cost Spanning Tree. | 04 |
| 9. | Implementation of Backtracking – N-Queens and Sum of Subsets Problems. | 04 |
| 10. | Implementation of a 0-1 Knapsack Problem. | 02 |
| 11. | Implementation of 15-puzzle problem using Branch and Bound. | 02 |
| 12. | Implementation of Naïve and Rabin-Karp algorithm. | 04 |
| TOTAL | | 30 |

Text Book(s):

| Title | Author/s | Publication |
|----------------------------|---|--------------|
| Introduction to Algorithms | Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein | PHI Learning |

Reference Book(s):

| Title | Author(s) | Publication |
|-------------------------------------|--|-----------------------|
| Fundamentals of Computer Algorithms | Ellis Horowitz, Sarataj Sahni, S.Rajasekaran | Universities Press |
| Algorithm Design | Michael Goodrich, Roberto Tamassia. | Wiley Student Edition |

Web Material Link(s):

- <http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html>
- <https://nptel.ac.in/courses/106101060>

Course Evaluation:**Theory:**

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 performance of practical, which will be evaluated out of 10 marks per each practical and average of the entire practical will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance consists of 30 marks during End Semester Exam.
- External viva consists of 30 marks in End Semester Exam.

Course Outcome(s):

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

| SECE2260 | DESIGN & ANALYSIS OF ALGORITHMS |
|----------|---|
| CO 1 | Define the fundamental concepts and characteristics of algorithms. |
| CO 2 | Explain various algorithm design techniques and their significance in solving computational problems. |
| CO 3 | Apply appropriate algorithmic techniques to solve given examples and computational problems. |
| CO 4 | Analyze and evaluate the time and space efficiency of algorithms designed using different techniques. |
| CO 5 | Develop optimized algorithms to solve real-world computational problems effectively. |

Mapping of CO with PO

| SECE2260 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 3 | 2 | 1 | | | | | | | | 1 |
| CO 2 | 3 | 3 | 2 | 1 | 2 | | | | | | 1 |
| CO 3 | 2 | 3 | 2 | 1 | 1 | | | | | | 1 |

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

Mapping of CO with PSO

| SECE2260 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
| CO 1 | 2 | 1 | 2 |
| CO 2 | 2 | 2 | 2 |
| CO 3 | 2 | 2 | 2 |
| CO 4 | 3 | 2 | 2 |
| CO 5 | 3 | 3 | 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 Algorithm Design and Analysis | 1, 2, 3, 4 |
| 2. | Divide and Conquer Algorithmic Design Method | 1, 2, 3, 4, 5, 6 |
| 3. | Greedy Method | 1, 2, 3, 4, 5, 6 |
| 4. | Backtracking Method | 1, 2, 3, 4, 5, 6 |
| 5. | Dynamic Programming Method | 1, 2, 3, 4, 5, 6 |
| 6. | Branch and Bound technique | 1, 2, 3, 4, 5, 6 |
| 7. | String Matching | 1, 2, 3, 4, 5, 6 |
| 8. | Introduction to NP-Completeness | 1, 2, 4 |

**P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SEEC2080

Course Name: Digital Logic Design

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 | 00 | 00 | 02 | 40 | 60 | 00 | 00 | 00 | 00 | 100 |

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the fundamental concepts of number systems, negative number representation, binary arithmetic, Boolean algebra, and Karnaugh map techniques for minimizing switching functions.
- introduce essential tools and methods for designing both combinational and sequential digital logic circuits.
- familiarize students with flip-flops, state machines, counters, and registers for practical digital system design.

Course Content:

| Section I | | | |
|------------------|---|-------|----------------|
| Module No. | Content | Hours | Weightage in % |
| 1. | Digital Systems and Binary Numbers Digital Systems, Number Systems, Base Conversion Methods, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes, BCD, EXCESS 3 and gray code. | 04 | 24 |
| 2. | Minimization Techniques Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms, Three-Variable K-Map, Four Variable K-Maps. POS & SOP Forms, Don't Care Conditions, Quine-McCluskey Method. | 03 | 13 |
| 3. | Combinational Logic Design Introduction, Binary Adder-Subtractor, Binary Multiplier, Decoders, Encoders, Multiplexers, Demultiplexers, Priority Encoder, Code Converters, Magnitude Comparator, HDL Models of Combinational Circuits. | 04 | 20 |
| 4. | Introduction to Flip-Flops Introduction to Sequential Circuits, Storage Elements: Latches, Flip-Flops, RS- Latch Using NAND and NOR Gates, Truth Tables and Excitation Tables, Conversion of Flip Flops. | 04 | 24 |
| 5. | Sequential Logic Design Introduction to State Machine, Mealy and Moore Model, State Machine Notation, State Diagram, State Table, Transition Table, Table Excitation | 03 | 10 |
| 6. | Registers and Counters | | |

| | | | |
|--|--|----|------|
| | Basic Concepts of Counters and Registers, Shift Registers, Registers with Parallel Load, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter, | 03 | 09 |
| | TOTAL | 30 | 100% |

Text Book (s):

| Title | Author/s | Publication |
|------------------------------|-----------------|------------------|
| Digital Design | M. Morris Mano | Pearson |
| Fundamentals of Logic Design | Charles H. Roth | Cengage LEarning |

Reference Book (s):

| Title | Author/s | Publication |
|-----------------------------------|----------------|-------------|
| Digital Logic Design | Malvino, Saha | TMH |
| Digital Logic and Computer Design | M. Morris Mano | Pearson |

Web Material Link(s):

<https://www.coursera.org/learn/digital-systems>

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 the completion of the course, the following course outcomes will be able to:

| SEEC2080 | DIGITAL LOGIC DESIGN |
|----------|---|
| CO 1 | Understand and analyze various number systems, binary codes, and error-detecting/error-correcting schemes used in digital systems. |
| CO 2 | Apply Boolean algebra, Karnaugh maps, and minimization techniques to simplify switching functions effectively. |
| CO 3 | Design and implement combinational logic circuits such as adders, multiplexers, encoders, comparators, and code converters. |
| CO 4 | Explain the operation of latches and flip-flops, and construct basic sequential circuits using appropriate excitation and conversion methods. |
| CO 5 | Develop and analyze state machines, counters, and registers for sequential logic applications. |

Mapping of CO with PO

| SEEC2080 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO 1 | 3 | 2 | 1 | 1 | 1 | | | | | 1 | 1 |
| CO 2 | 3 | 3 | 2 | 1 | 1 | | | | | 1 | 1 |
| CO 3 | 3 | 2 | 3 | 2 | 2 | | | | | 1 | 1 |
| CO 4 | 2 | 2 | 2 | 1 | 1 | | | | | 1 | 1 |
| CO 5 | 2 | 3 | 3 | 2 | 2 | | | | | 1 | 1 |

Mapping of CO with PSO

| SEEC2080 | PSO1 | PSO2 | PSO3 |
|----------|------|------|------|
|----------|------|------|------|

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

| Module No | Content | RBT Level |
|-----------|------------------------------------|-----------|
| 1 | Digital Systems and Binary Numbers | 1,2 |
| 2 | Minimization Techniques | 2,3 |
| 3 | Combinational Logic Design | 3,4 |
| 4 | Introduction to Flip-Flops | 4,3 |
| 5 | Sequential Logic Design | 5,4 |
| 6 | Registers and Counters | 6,5,4 |