



PPSU

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

B.TECH. (ELECTRONICS AND

COMMUNICATION ENGINEERING)

SYLLABUS BOOK

AY 2025-26

INSTITUTE VISION

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

INSTITUTE MISSION

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

Graduates will demonstrate ability to:

PEO No	PROGRAMME EDUCATIONAL OBJECTIVES
PEO 1	Apply core principles of electronics, communication, computing, and allied engineering domains to analyze, design, and develop innovative solutions for real-world engineering problems.
PEO 2	Demonstrate professional competency by using modern tools, emerging technologies, and research skills while pursuing higher studies, entrepreneurship, and continuous learning to adapt to evolving global challenges.
PEO 3	Exhibit ethical values, effective communication, teamwork, leadership qualities, and a strong sense of social responsibility to contribute sustainably to society and the engineering profession.

PO No	PROGRAMME OUTCOMES
PO 1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	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.

PO 3	Design/development of solutions:
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PO No	PROGRAMME OUTCOMES
	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.
PO 4	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.
PO 5	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.
PO 6	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.
PO 7	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO 8	Individual and Collaborative Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 9	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.
PO 10	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.

PO 11	Life-Long Learning:
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PO No	PROGRAMME OUTCOMES
	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.

PSO No	PROGRAMME SPECIFIC OUTCOMES (PSO) ELECTRONICS AND COMMUNICATION ENGINEERING
PSO 1	Design, evaluate, and realize analog and digital electronic systems using contemporary hardware and software tools for applications in communication, embedded systems, and VLSI.
PSO 2	Apply principles of wireless communication, signal processing, IoT, networking, and next-generation communication technologies to create efficient, dependable engineering solutions.
PSO 3	Leverage technical expertise, analytical thinking, and research approaches to generate novel products, interdisciplinary solutions, and entrepreneurial initiatives that address industry and societal requirements.

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.
(B. Tech. Electronics & Communication
Engineering)

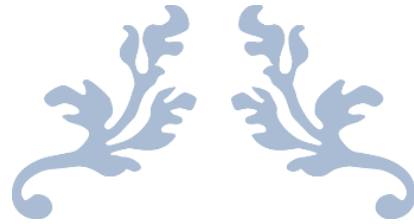


P P Savani University
School of Engineering

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

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FIRST YEAR B. TECH.



P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR FIRST YEAR B.TECH. COMPUTER ENGINEERING PROGRAMME AY: 2025-26

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
1 OR 2	SESH1110	Calculus	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SEME1210	Basics of Mechanical Engineering	ME	3	0	2	5	5	40	60	0	0	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 analyzing 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'Hôpital'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-	11	20

	ordinates		
		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		2	1
CO 2		2	1
CO 3		2	1
CO 4		2	1
CO 5		2	1

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

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

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

**P P Savani University
School of Engineering**

Department of Mechanical Engineering

Course Code: SEME1210

Course Name: Basics of Mechanical Engineering

Prerequisite Course(s): -- None

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	-	02	05	40	60	-	-	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
6.	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

7.	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
8.	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		2	1
CO 2		2	1
CO 3		2	1
CO 4		2	2
CO 5		3	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 Information Technology

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	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	1
CO 2	3	2	1
CO 3	3	2	1
CO 4	2	2	1
CO 5	3	3	2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction to Python	1,2,4
2.	Decision Structures in Python	1,2,3
3.	Array and Strings in Python	1,2,3
4.	Dictionary, List, Tuples and Sets	2,3,4
5.	Functions, Modules and Packages in Python	2,3,4
6.	Python Object Oriented Programming	3,4,6
7.	Files & Regular Expression in Python	3,4,6
8.	Exception Handling in Python	3,4,5
9.	Building Desktop Application	2,3,4

**P P Savani University
School of Engineering**

Department of Science and Humanities

Course Code: SESH1130

Course Name: Experimental Physics

Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)			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, 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	09	18

	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
10.	To determine the velocity of ultrasonic waves in a given liquid and also to determine the compressibility of the liquid.	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		2	1
CO 2		2	1
CO 3		2	1
CO 4		3	2
CO 5		2	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	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, RowSpace, 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		3	1
CO 2		3	1
CO 3		2	1
CO 4		2	1
CO 5		2	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. Levelling: Instrument used, Terminology, Types of leveling, Methods of leveling. Modern tools: Introduction to theodolite, Total Station, GPS.	10	20

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 scarpers, Dams, Rain Water harvesting, Batch mix plant, Ready Mix Concrete plant, Green building, Earth quake resisting building.	05	10

List of Tutorial:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Links:

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

Course Evaluation:

Theory:

- Continuous evaluation consists of two tests each of 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		2	1
CO 2		2	1
CO 3		3	2
CO 4		3	2
CO 5		3	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 Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions.	05	12
7.	User-Defined Functions: Concepts of User-defined Functions, Prototypes, function Definition,	06	13

	Parameters, Parameter Passing, Calling a Function, Recursive Function.		
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=3QiItnIWmOM>

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	1
CO 2	3	2	1
CO 3	3	2	1
CO 4	2	2	1
CO 5	3	3	2

Level of Revised Bloom's Taxonomy in Assessment

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

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

P P Savani University
School of Engineering

Department of Electronics & Communication Engineering

Course Code: SEEC1210

Course Name: Basics of Electrical and Electronics

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Module No.	Content	Hours	Weightage in %
1	Fundamental of Electrical Engineering: Electrical circuit elements, resistor, capacitor, inductor, voltage and current sources, Ohm's law. Series and parallel combinations of resistors and capacitors, Kirchoff's current and voltage laws. Analysis of circuits by Node voltage method and mesh current method. Analysis of circuits using source transformation, Thevenin and Norton equivalent models. Notion of linearity, superposition theorem, maximum power transfer theorem, Milman's theorem.	12	28
2	Circuit Analysis and Power Concepts: Transient analysis of electrical circuits, cyclo-stationary analysis of RLC circuits. Notion of power in DC and AC circuits and concepts of real and reactive power in AC circuits, power factor, polyphase circuits, star- delta conversion.	11	24
3	Semiconductor Devices: Basic concepts of semiconductor devices, PN junction diode, characteristics and its application as rectifier circuits (half-wave and full-wave rectifiers), types of diodes, BJT, JFET, MOSFET.	12	26
4	Digital Electronics: Number systems, logic gates, Boolean algebra, De-Morgan's theorem, combinational and sequential circuits, half adder & full adder, flip flops.	10	22
	Total	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	To understand the electronic measuring devices and electronic components.	02
2.	To verify the Ohm's Law.	02
3.	To verify the Kirchoff's current and Kirchoff's voltage law.	02
4.	To verify the Norton's and Thevenin's theorem.	04
5.	To verify the delta and star connection.	04
6.	To study I-V characteristics of p-n junction diode.	02
7.	To study the cathode ray oscilloscope and to understand how to take measurement, time period and frequency.	02
8.	To study the half wave and full wave rectifier.	04
9.	To verify transistor as a switch & amplifier.	04
10.	To verify all the logic gates using bread board.	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	3	2	1	2					1	
CO 2	3	3	3	2	2					1	
CO 3	3	3	2	2	2					1	
CO 4	3	2	2	2	2					1	
CO 5	3	3	3	2	3				1	2	1

Mapping of CO with PSO

SEEC1210	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	3	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	Fundamental of Electrical Engineering	1,2, 3, 4
2	Circuit Analysis and Power Concepts	2,3,4
3	Semiconductor Devices	2,3
4	Digital 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	2
CO 2		1	2
CO 3		2	3
CO 4		1	3
CO 5		2	3

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

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

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

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE1220
Course Name: Digital Proficiency
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
3	-	-	3	40	60	-	-	-	-	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 usage.	07	15
7.	Emerging Technologies and Industry Trends Overview of Industry 4.0 concepts: IoT, AI, Robotics, and Blockchain. Applications of emerging technologies in various engineering	07	15

	domains. Case studies: Smart cities, sustainable manufacturing, and automation. Preparing for future technological trends and job roles.		
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

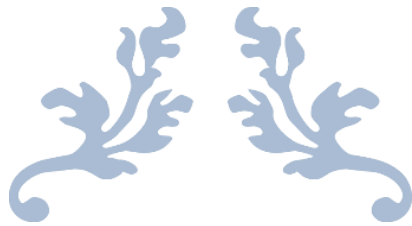
Mapping of CO with PSO

SECE1220	PSO1	PSO2	PSO3
CO 1	1	2	2
CO 2	2	2	2
CO 3	2	3	2
CO 4	1	2	2
CO 5	2	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 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. (ECE) AY: 2026-27

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	
3	SESH2140	Differential Equations & Statistics	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SEEE2210	Network Analysis & Synthesis	EE	2	0	0	2	2	40	60	0	0	0	0	100
	SEEC2010	Analog and Digital Communication	EC	3	2	0	5	4	40	60	40	60	0	0	200
	SEEC2021	Digital Circuits & System Design	EC	3	2	0	5	4	40	60	40	60	0	0	200
	SEEC2030	Electronic Devices and Op-amps	EC	3	2	0	5	4	40	60	40	60	0	0	200
	CFLS2140	Upper Intermediate Communicative English	CFLS	2	0	0	2	2	100	0	0	0	0	0	100
	CLSC2020	IPDC-I	CLSC	2	0	0	2	2	100	0	0	0	0	0	100
				Total	26	23								1100	

4	SEEC2040	Control Systems	EC	2	0	3	5	5	40	60	0	0	40	60	200
	SEEC2050	Electromagnetic Field Theory	EC	3	0	1	4	4	40	60	0	0	40	60	200
	SEEC2060	Signals & Systems	EC	3	2	0	5	4	40	60	40	60	0	0	200
	SEEC2070	Microprocessor & Microcontroller	EC	3	2	0	5	4	40	60	40	60	0	0	200
		Elective-I	EC	2	2	0	4	3	40	60	40	60	0	0	200
	CLSC2030	IPDC-II	CLSC	2	0	0	2	2	100	0	0	0	0	0	100
					Total	25	22								1100

**P P Savani University
School of Engineering**

Department of Science & Humanities

Course Code: SESH2140

Course Name: Differential Equations & Statistics

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

- recall existing knowledge of calculus and apply it for solving engineering problems involving differential equations.
- introduce partial differential equations with different methods of solution.
- understand periodic functions expressed as a Fourier series and applications of Fourier series to odes.
- introduce the basic statistical data analysis and probability distribution.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Ordinary Differential Equation-I 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 Ordinary Differential Equation-II ODEs of Second and Higher order, Homogeneous linear ODEs, Linear Dependence and Independence of Solutions, Homogeneous linear ODEs with constant coefficients, Nonhomogeneous ODEs, Variation of Parameters.	10	20
2.	Partial Differential Equation Formation of First and Second order equations, Solution of First order equations, Linear and Non-linear equations of first, Higher order equations with constant coefficients, Complementary function, Particular Integrals.	07	18
3.	Fourier Series Periodic function, Euler Formula, Arbitrary Period, Even and Odd function, Half-Range Expansions	05	12
4.	Basics of Statistics Elements, Variables, Observations, Quantitative and Qualitative data, Cross-sectional and Time series data, Frequency distribution, Dot plot, Histogram, Cumulative distribution, Measure of location, Mean, Median, Mode, Percentile, Quartile, Measure of variability, Range, Interquartile	07	15

	Range, Variance, Standard Deviation, Coefficient of Variation.		
5.	Correlation & Regression Analysis Regression Analysis, Regression line and regression coefficient, Karl Pearson's method.	07	15
6.	Probability Distribution Introduction, Conditional probability, independent events, independent experiments, Theorem of TOTAL probability and Bayes' theorem, Probability distribution, Binomial distribution, Poisson distribution, Normal distribution, Hypothesis.	09	20
TOTAL		45	100

List of Tutorial(s):

Sr. No.	Name of Tutorial	Hours
1.	Ordinary Differential Equation-1	02
2.	Ordinary Differential Equation-2	02
3.	Ordinary Differential Equation-3	04
4.	Partial Differential Equation-1	02
5.	Partial Differential Equation-2	04
6.	Fourier Series-1	02
7.	Fourier Series-2	02
8.	Basics of Statistics-1	02
9.	Basics of Statistics-2	02
10.	Correlation & Regression Analysis	02
11.	Probability-1	02
12.	Probability-2	02
TOTAL		30

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>

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 per each tutorial and average of the same will be converted to 50 marks.
- Assignment consists of 20 marks.
- Internal viva consists of 30 marks.

Course Outcome(s):

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

SESH2140	DIFFERENTIAL EQUATIONS & STATISTICS
CO 1	Apply methods to solve first-order ordinary differential equations (separable, exact, linear, Bernoulli).
CO 2	Solve higher-order ordinary differential equations and analyze their solutions.
CO 3	Formulate and solve partial differential equations using standard techniques.
CO 4	Represent periodic functions using Fourier series and analyze their properties.
CO 5	Adapt the knowledge of various probability distribution and their applications in mathematical models, sport strategies and insurance.

Mapping of CO with PO

SESH2140	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	1		1						
CO 2	3	2	1	1	1						
CO 3	3	3	2	1	1						
CO 4	3	2	1	1	2						
CO 5	2	3	2	2	1	1					

Mapping of CO with PSO

SESH2140	PSO1	PSO2	PSO3
CO 1	2	1	
CO 2	2	1	
CO 3	2	1	
CO 4	2		1
CO 5	1		

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.	Ordinary Differential Equation	1, 2, 3, 5
2.	Partial Differential Equation	1, 2, 4, 5
3.	Laplace Transform	1, 2, 4, 5
4.	Fourier Series & Fourier Integral	1, 2, 3, 4, 5
5.	Basics of Statistics	1, 2, 3, 4, 5
6.	Probability Distribution	1, 2, 3, 4, 5

**P P Savani University
School of Engineering**

Department of Electrical Engineering

Course Code: SEEE2210

Course Name: Network Analysis & Synthesis

Prerequisite Course(s): Basic of Electrical and Electronics

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

- Understand the fundamental principles of network analysis, including AC/DC circuits, network theorems, and resonance.
- Analyze two-port networks, network functions, and frequency response for practical electrical and electronic circuits.
- Apply network synthesis techniques and Laplace transform methods to design and solve circuits for real-world applications.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Methods of Network Analysis Mesh and node variable analysis; Star Delta transformation; Steady state analysis of AC circuits, Network Theorems	02	8
2.	Characteristics of the sinusoid: Average, peak and effective values, Impedance concept, Active, reactive and complex power, Power factor, Q of coils and capacitors, Series and parallel resonances, Series Parallel reduction of AC/DC circuits	04	12
3.	Network Graph Theory: Network Matrices, Incidence and Reduced Incidence matrix, Tree, Co-tree, Cut-set, Tie-set equations, Relationship between network Matrices, Formulation of network equations	04	12
4.	Two Port Networks: open circuit impedance Z parameters, short circuit admittance Y parameters, Hybrid h parameters, Chain parameters ABCD and g parameters, T and pie network, Relationship between different two port network	04	14
5.	Laplace Transform & Network Functions Laplace transform basics & properties, initial and final value theorem, Application to circuit analysis, Network functions: Driving point & transfer functions, Poles, zeros, stability concepts, inverse transforms, use	04	12

	of transfer function in network analysis.		
6.	Steady State & Transient Analysis DC and sinusoidal response of R-L-C circuits, State Equations for Networks: Basic consideration in writing state equations, order of complexity, Formulation of state equations, Solutions of state equations, State transition matrix.	04	15
7.	Frequency Response & Resonance Frequency response of R, L, C circuits, Series & parallel resonance, Bandwidth, Q-factor, Selectivity, Applications in filter circuits	04	12
8.	Network Synthesis Positive real functions and properties, Foster & Cauer forms, LC, RC, RL network synthesis, Filter design basics	04	15
TOTAL		30	100

Text Book(s):

Title	Author/s	Publication
Network Analysis	M. E. Valkenburg	PHL
Fundamental of Electrical Circuit	Matthew Sadiku	McGraw Hill
Network Theory: Analysis and Synthesis	S. Ghosh	PHI

Reference Book(s):

Title	Author/s	Publication
Circuits & Networks: Analysis & Synthesis	A. Sudhakar & Shyammohan S. Palli	McGraw Hill
Circuit Theory	T. S. K. Iyear	TMG Hill,
Networks And Systems	D Roy Choudhary	NEW AGE International

Web Material Link(s):

- <https://www.circuitlab.com/>
- <https://everycircuit.com/>
- <https://4sight.cloud/electrical-network-monitoring-and-control-system>
- <https://sites.google.com/view/naslabeec262?usp=sharing>

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 completion of the course, the students will be able to

SEEE2210	Network Analysis & Synthesis
CO 1	Explain methods of network analysis, characteristics of sinusoidal signals, and steady-state behavior of AC/DC circuits.
CO 2	Apply mesh, nodal, star-delta transformations, and network theorems to solve AC/DC circuits.
CO 3	Analyze two-port networks, network graphs, state equations, and transient response of electrical networks.
CO 4	Evaluate network functions, frequency response, resonance, and filter characteristics for electrical circuits.
CO 5	Design and synthesize networks using Foster/Cauer forms and passive elements to meet specified response criteria.

Mapping of CO with PO

SEEE2210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2			2			1			2
CO 2	3	3	2	2	3			1			2
CO 3	3	3	2	2	3	1		1			2
CO 4	3	3	2	2	3	1		1			2
CO 5	3	3	3	2	3	1	1	1	1	1	3

Mapping of CO with PSO

SEEE2210	PSO1	PSO2	PSO3
CO 1	1	1	2
CO 2	1	2	2
CO 3	1	3	2
CO 4	1	3	2
CO 5	1	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	Methods of Network Analysis: Mesh/node analysis, star-delta transformation, network theorems	1, 2, 3
2	Characteristics of the Sinusoid: RMS, impedance, active/reactive power, series/parallel resonance	1, 2, 3
3	Network Graph Theory: Network matrices, tree, co-tree, cut-set, tie-set equations	2, 3, 4
4	Two-Port Networks: Z, Y, h, ABCD parameters, T & π networks, relationships	2, 3, 4
5	Laplace Transform & Network Functions: Properties, initial/final value theorem, driving/transfer functions, stability	2, 3, 4, 5
6	Steady-State & Transient Analysis: DC/sinusoidal response, state equations, state transition matrix	2, 3, 4
7	Frequency Response & Resonance: Series/parallel resonance, Q-factor, bandwidth, filters	3, 4, 5
8	Network Synthesis: Positive real functions, Foster/Cauer forms, LC, RC, RL synthesis, filter design	3, 4, 5, 6

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2010

Course Name: Analog and Digital Communication

Prerequisite Course(s): Basics of Electrical & Electronics and Engineering Mathematics

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 fundamentals of analog and digital communication systems.
- Analyze modulation and demodulation techniques used in electronic communication.
- Study noise performance and system bandwidth considerations.
- Learn data encoding, multiplexing, and error detection/correction methods.
- Understand digital communication system design, including PCM, ASK, FSK, PSK, QAM, and modern communication technologies.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Communication Systems: Communication process – Types of communication – Analog vs Digital communication – Elements of a communication system	06	10
2.	Amplitude Modulation (AM): Need of modulation – AM principles – Power relations – DSB, SSB, VSB techniques – Demodulation (Envelope detector, Synchronous detector)	08	15
3.	Angle Modulation (FM & PM): Frequency and Phase modulation – Bandwidth calculations – Comparison of AM, FM, PM – FM generation & detection – PLL	05	10
4.	Noise in Communication Systems: Types of noise – SNR – Noise figure – Noise performance in AM & FM systems – Pre-emphasis & De-emphasis	06	15
5.	Pulse Analog Modulation: Sampling theorem – Aliasing – PAM, PWM, PPM generation & detection	06	15
6.	Pulse Digital Modulation: Pulse Code Modulation (PCM) – Quantization & encoding – DPCM, DM, ADM – Companding (μ -law, A-law)	05	15
7.	Digital Modulation Techniques: ASK, FSK, PSK, QPSK, DPSK, QAM – Modulation & demodulation circuits – Bandwidth and power efficiency	05	10
8.	Error Control & Information Theory: Channel capacity – Entropy –	04	10

	Source coding – Error detection & correction: Parity, Hamming codes		
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Study of communication system trainer kit	02
2.	AM generation and detection	04
3.	FM generation and detection	04
4.	Study of sampling & reconstruction	04
5.	PWM, PPM techniques	04
6.	PCM encoding & decoding	04
7.	ASK, FSK digital modulation	04
8.	PSK/QPSK modulation & demodulation	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Communication Systems	Simon Haykin	Wiley India
Principles of Communication Systems	Taub & Schilling	McGraw-Hill

Reference Book(s):

Title	Author/s	Publication
Modern Digital & Analog Communication Systems	B.P. Lathi	Oxford University Press

Web Material Link(s):

- <https://nptel.ac.in/courses/108104112>
- <https://www.electronics-tutorials.ws>
- https://www.tutorialspoint.com/digital_communication
- <https://www.allaboutcircuits.com>

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 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

SEEC2010	Analog and Digital Communication
CO 1	Understand principles of analog and digital communication systems.
CO 2	Analyze AM, FM, PM modulation and demodulation circuits.
CO 3	Apply pulse modulation and PCM techniques in lab and real applications.
CO 4	Evaluate digital modulation schemes such as ASK, FSK, PSK, QAM.
CO 5	Analyze performance of communication systems under noise.

Mapping of CO with PO

SEEC2010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	2	1	1		1			1	
CO 2	3	3	2	2	2				1	1	
CO 3	3	2	3	2	3				2	1	
CO 4	3	3	2	3	3				1	1	1
CO 5	2	3	2	3	3				1	1	1

Mapping of CO with PSO

SEEC2010	PSO1	PSO2	PSO3
CO 1	2	3	1
CO 2	3	3	2
CO 3	3	3	2
CO 4	3	3	3
CO 5	2	3	2

Level of Revised Bloom's Taxonomy in Assessment:

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

Module No	Content	RBT Level
1	Introduction to communication	1, 2
2	AM, SSB, VSB	2,3
3	FM, PM	2,4
4	Noise & SNR	2,4
5	Pulse analog modulation	2,3
6	PCM, DPCM, DM	2,3,4
7	ASK, FSK, PSK, QAM	3,4,5
8	Information theory & coding	2,4,5,6

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2021

Course Name: Digital Circuits & System Design

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	-	04	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

1. To understand number systems, digital codes, Boolean algebra, and basic logic gates.
2. To analyse and design combinational logic circuits using MSI components.
3. To understand latches, flip-flops, and design sequential logic circuits.
4. To design synchronous state machines using formal state-diagram methods.
5. To study logic families and their characteristics.
6. To understand semiconductor memories, PLAs, PALs, and memory interfacing.

Course Content:

Module No.	Content	Hours	Weightage in %
1	Number Systems, Codes, and Digital Logic Basics: Binary, octal, decimal and hexadecimal systems; conversions; signed magnitude, 1's & 2's complement arithmetic. Binary codes: BCD, Excess-3, Gray code, ASCII, error detection codes. DeMorgan's theorems, duality principle. Logic gates: AND, OR, NOT, NAND, NOR, XOR, XNOR; universal gates; implementation examples.	6	13
2	Boolean Algebra, Simplification & K-Maps: Boolean identities and algebraic simplification, Standard forms: SOP, POS, minterms, maxterms, canonical expressions. Karnaugh Maps (K-Maps); simplification using K-maps; don't-care conditions; tabulation method (Quine-McCluskey).	6	13
3	Combinational Circuits: Basics of Combinational logic design. Adders, subtractors, comparators. MSI Components: Encoders, decoders, multiplexers, demultiplexers. Priority encoder, parity generator/checker. Implementation using multiplexers & decoders. Design Problem Using MSI Circuits.	6	13

4	Sequential Circuits Fundamentals: Latches: SR and D latch, gated latch, Flip-flops: SR, JK, T, D flip-flops; master-slave operation. Edge-triggered vs. level-triggered FFs; master-slave operation. Flip-flop conversions ($T \leftrightarrow D \leftrightarrow JK$).	6	11
5	Registers, Counters & Shift Operations: Registers: Serial-in Serial-out (SISO), Serial-in Parallel-out (SIPO), Parallel-in Serial-out (PISO), Parallel-in Parallel-out (PIPO), Universal shift register. Synchronous counters: ripple vs. synchronous counters. Design of binary counters, up/down counters, BCD counters, modulus-N counters. Ring counter, Johnson counter.	6	13
6	Synchronous Sequential Machine Design: Sequential circuit design steps: Problem specification, State diagram, State table, State reduction, State assignment. Design of synchronous sequential circuits using flip-flops. Mealy & Moore machine design.	5	13
7	Logic Families: Characteristics of logic families: Fan-in, fan-out, noise immunity, noise margin. Propagation delay, power dissipation. Digital IC logic families: TTL, ECL, CMOS: complementary MOS logic, power-delay characteristics. Interfacing between TTL-CMOS families.	4	11
8	Semiconductor Memories: Memory classification: volatile vs non-volatile, static vs dynamic. RAM, ROM, PROM, EPROM, EEPROM – structure & working. PLA & PAL: architecture, programming principles, implementation of logic functions. Memory organization: Addressing, Memory expansion, Interfacing memory with processors.	6	13
Total		45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	To study and verify basic logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR) using ICs.	02
2.	To implement Boolean expressions using basic gates and verify their truth tables.	02
3.	To simplify Boolean expressions using Karnaugh Maps (K-Map) and implement the minimized circuit.	04
4.	To implement and verify the operation of half adder, full adder, and parallel binary adder.	02
5.	To design and verify 4:1 and 8:1 multiplexer circuits and implement a Boolean function using MUX.	04

6.	To design and verify binary-to-Gray encoder and BCD-to-7-segment decoder circuits.	02
7.	To study the working of SR, JK, T, and D flip-flops using ICs and verify their truth tables.	04
8.	To design and verify asynchronous (ripple) counter and synchronous counter (up/down, modulo-N).	04
9.	To implement and test shift register operations (SISO, SIPO, PISO, PIPO).	04
10.	To implement combinational logic using PLA or PAL.	02
Total		30

Text Book(s):

Title	Author/s	Publication
Modern Digital Electronics	R. P. Jain	4th Edition, Tata McGraw Hill, 2009.
Digital Logic and Computer Design	M. Morris Mano & Michael D. Ciletti	Fourth Edition, Pearson Prentice Hall Publication.
Fundamentals of Digital Circuits,	A. Anand Kumar	PHI 4th edition, 2018
Digital Circuits and Systems	D.V. Hall	Tata McGraw Hill, 1989.
Digital Electronics- An Introduction to Theory and Practice	W.H. Gothmann	PHI, 2nd edition, 2006.

Web Material Link(s):

- <https://archive.nptel.ac.in/content/storage2/courses/106108099/Digital%20Systems.pdf>
- <https://www.srecwarangal.ac.in/ece-downloads/Digital%20Electronics.pdf>

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SEEC202 1	DIGITAL CIRCUITS & SYSTEM DESIGN
CO 1	Understand number systems, Boolean algebra, logic gates, and apply logic simplification techniques such as Karnaugh maps and canonical forms.
CO 2	Analyse and design combinational logic circuits including adders, subtractors, multiplexers, decoders, comparators, and MSI-based implementations.
CO 3	Explain the operation of flip-flops, latches, registers, and counters, and Analyse synchronous sequential circuits using state diagrams and state reduction techniques.
CO 4	Design and Analyse asynchronous sequential circuits, identify race conditions and hazards, and apply hazard-free design principles.
CO 5	Understand logic families, memories, and programmable logic devices (PLA, PAL, FPGA/CPLD) and apply them for implementing digital systems.

Mapping of CO with PO:

SEEC2021	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	2	2	1	2	1				1	1	
CO 2	2	2	3	2	2				1	1	
CO 3	3	3	3	3	2	1	1		1	1	1
CO 4	3	2	2	3	1		1			1	
CO 5	2	2	3	2	3	1	1	1	1	1	1

Mapping of CO with PSO:

SEEC2021	PSO 1	PSO 2	PSO 3
CO 1	3	1	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	2	3
CO 5	3	3	3

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

1: Remember	2: Understand	3: Apply
4: Analyse	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Number Systems, Codes, and Digital Logic Basics	1,2
2	Boolean Algebra, Simplification & K-Maps	2,3
3	Combinational Circuits	3,4,6
4	Sequential Circuits Fundamentals	2,3
5	Registers, Counters & Shift Operations	3,4,6
6	Synchronous Sequential Machine Design	3,4,6
7	Logic Families	2,4,5
8	Semiconductor Memories	3,4,6

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2030

Course Name: Electronic Devices and Op-Amp

Prerequisite Course(s): -- Basic Electrical Engineering, Electric Circuits, and Semiconductor Physics.

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

- To understand the basic principles of semiconductor materials, PN junctions, and diode circuits.
- To learn BJT structure, characteristics, and biasing for amplification and switching.
- To understand the fundamentals, characteristics, and parameters of operational amplifiers.
- To analyze and design linear op-amp circuits such as amplifiers, filters, and signal conditioners.
- To analyze nonlinear op-amp circuits, regulators, oscillators, and data-conversion systems.

Course Content:

Module No.	Content	Hours	Weightage in %
1	Semiconductor Physics and Materials: Crystal structures (SC, BCC, FCC), Energy band diagrams of solids, Intrinsic & extrinsic semiconductors, Doping: donor/acceptor impurities, Carrier concentration, mobility, conductivity, Drift & diffusion currents, continuity equation, Hall effect & applications, Temperature dependence.	6	13
2	PN Junction Theory and Diode Applications: Formation of PN junction, depletion region, barrier potential. VI characteristics of PN junction diode (ideal & practical). Zener diode: breakdown mechanism, VI characteristics, voltage regulation. Rectifiers: half-wave, full-wave, bridge rectifier; ripple factor, efficiency. Diode-based clippers, clampers and multipliers.	6	13
3	Bipolar Junction Transistors – Structure, Operation & Biasing: construction and working, CB/CE/CC configurations, Input/output, DC & AC load lines, Biasing circuits: fixed bias, voltage divider bias, Stability factor & biasing stability, BJT as basic amplifier (concept only), Switching characteristics.	6	13
4	Operational Amplifier Fundamentals: Introduction to op-amp, block diagram representation. Ideal op-amp characteristics vs.		

	practical limitations. Input offset voltage, input bias current, slew rate, CMRR, PSRR. Frequency response of op-amp, gain-bandwidth product. negative feedback principle and virtual ground.	5	11
5	Linear Applications of Op-Amps: Inverting and non-inverting amplifiers – design and analysis. Summing, subtracting, averaging amplifiers. Difference amplifier and instrumentation amplifier (three op-amp configuration). Integrator, differentiator: ideal and practical design considerations. Active filters: 1st-order LPF, HPF, BPF, BSF.	6	16
6	Nonlinear Applications of Op-Amps: Op-amp as comparator: zero-crossing detector, window comparator. Schmitt trigger: inverting and non-inverting configurations. Oscillators: Barkhausen criteria, Wien bridge, RC phase shift, Hartley, and Colpitts oscillators. Multivibrators (astable and monostable) using op-amps and the 555 timer IC.	5	11
7	Voltage Regulators & Oscillators: Series & shunt regulators, 78xx & 79xx fixed regulators, LM317 adjustable regulator, Op-amp oscillators: RC phase shift, Wien bridge. Basic power amplifier classes (A, B, AB).	5	12
8	Data Converters & Integrated System Applications: ADC: flash, weighted resistor, dual-slope, DAC: R-2R ladder, weighted DAC, Sample rate & resolution basics, Signal conditioning circuits, Op-amp applications in instrumentation.	6	11
	Total	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	To study VI characteristics of PN junction diode and Zener diode.	02
2.	To design and test half-wave and full-wave rectifier circuits with filters.	04
3.	To study characteristics of BJTs in CE configuration	02
4.	To design and analyse BJT biasing circuits.	04
5.	To study CE amplifier – gain measurement and plotting frequency response	02
6.	To study basic op-amp parameters (offset voltage, slew rate, CMRR).	02
7.	To design and test inverting and non-inverting amplifier circuits.	04
8.	To design Op-amp integrator and differentiator.	04
9.	To study precision rectifier, comparator, and Schmitt trigger circuits.	02
10.	To design and analyse regulator circuits (78xx/79xx/LM317) or op-amp oscillators.	04
Total		30

Reference Book(s):

Title	Author/s	Publication
Microelectronic Circuits	Sedra & Smith	Oxford University Press.
Integrated Electronics: Analog and Digital Circuits and Systems	Millman, J., & Halkias, C.	McGraw Hill Education, 2nd Edition, 2010.
Electronic Principles	Malvino, A., & Leach, D. P.	McGraw Hill Education, 7th Edition, 2007.

Text Book(s):

Title	Author/s	Publication
Electronic Devices and Circuit Theory	Boylestad & Nashelsky	Pearson Education, 11th Edition, 2013.
Op-Amps and Linear Integrated Circuits	Ramakant Gayakwad	Prentice Hall / Pearson Education, 4th Edition, 2000.

Web Material Link(s):

- https://www.electronics-tutorials.ws/opamp/opamp_1.html.
- https://igitsarang.ac.in/assets/documents/coursematerial/basic_electronics_note-2nd_sesemster_btech_compressed_1589976528.pdf.
- <https://nptel.ac.in/courses/122106025>.

Course Evaluation:**Theory:**

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

Practical:

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

Course Outcome(s):

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

SEEC2030	ELECTRONIC DEVICES AND OP-AMP
CO 1	Understand semiconductor physics and operation of diodes and rectifier circuits.
CO 2	Explain BJT structure, operation, characteristics, and biasing methods.
CO 3	Understand the fundamentals and parameters of operational amplifiers.
CO 4	Analyze and design linear op-amp circuits (amplifiers, filters, integrators, differentiators).
CO 5	Analyze nonlinear op-amp circuits, regulators, oscillators, and ADC/DAC applications.

Mapping of CO with PO:

SEEC2030	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	1	2						1	1
CO 2	3	3	2	2	1					1	2
CO 3	3	2	2	2	2				1	1	3
CO 4	3	3	3	3	2				1	1	2
CO 5	3	2	3	3	3	1		1	1	1	3

Mapping of CO with PSO:

SEEC2030	PSO 1	PSO 2	PSO 3
CO 1	3	1	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	3	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	Semiconductor Physics and Materials	1,2
2	PN Junction Theory and Diode Applications	1,2,3,4
3	Bipolar Junction Transistors (BJTs)	2,3,4
4	Op-Amp Fundamentals	1, 2,4
5	Linear Op-Amp Applications	2,3,4,6
6	Nonlinear Op-Amp Applications	2,3,4,5
7	Voltage Regulators & Oscillators	2,3,4,5
8	Data Converters & Integrated Systems	2,3,4,5

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2040
Course Name: Control Systems
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	-	03	05	40	60	-	-	40	60	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Understand the fundamentals and components of control systems.
- Analyze control systems using time and frequency domain techniques.
- Learn control actions, PID controllers, compensators, and state-space concepts.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Control Systems: Basic components of control system; Classification — Open loop & Closed loop; Servomechanism & Regulator; Process control; Feedback systems: Characteristics & Performance	04	13
2.	Modelling of Control Systems Mathematical modelling; Transfer function approach; Block diagram representation & reduction; Signal flow graph and Mason's gain formula; Error analysis	05	13
3.	Time Response Analysis Time response of first & second order systems; Steady-state errors & error constants; Sensitivity; Concept of stability	05	13
4.	Root Locus Technique Root Locus Technique: Concept of root locus, rules for constructing root locus, stability analysis using root locus.	04	9
5.	Frequency Response Analysis – I Frequency Response Analysis – I: Correlation between time and frequency response, polar plots, bode plot, stability margins in Bode plots.	04	11
6.	Frequency Response Analysis – II Nyquist criteria; Stability assessment using Nyquist plot; Introduction to classical design; Basics of lead, lag & lead-lag compensators.	04	13
7.	Control Actions and Controller Characteristics Basic P, I, D control actions; PI & PD controllers; Simple tuning principle.	02	13
8.	Sampled Data and State Space Analysis Sample & hold (concept); Introduction to state space representation; Basic controllability and observability (SISO only)	02	13
TOTAL		30	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Fundamentals of Control Systems: Open-loop vs Closed-loop	03
2.	Servomechanism, Regulator & Process Control – Case Examples	03
3.	Transfer Function Derivations for Mechanical & Electrical Systems	03
4.	Block Diagram Reduction Problems	03
5.	Signal Flow Graphs & Mason's Gain Formula Practice	03
6.	Time Domain Specifications for 1st & 2nd Order Systems (Problems)	03
7.	Steady State Error Calculations & Sensitivity Analysis	03
8.	Stability Conditions & Routh-Hurwitz Criterion (Numerical)	03
9.	Root Locus Construction Practice (Step-by-step plotting)	03
10.	Bode Plot Problems including Phase/ Gain Margin Calculations	03
11.	Nyquist Plot Examples & Practical Stability Assessment	03
12.	Controller Design Problems (P, PI, PD, PID)	03
13.	Compensator Design Case Study (Lag, Lead, Lag-Lead)	03
14.	Sample & Hold, Z-transform Numerical Exercises	03
15.	State Space Representation + Controllability & Observability Problems	03
	TOTAL	45

Text Book(s):

Title	Author/s	Publication
Control Systems Engineering (4th Edition, 2006)	Nagrath & Gopal	New Age International
Automatic Control Systems (9th Edition, 2009)	B. C. Kuo	Wiley India

Reference Book(s):

Title	Author/s	Publication
Digital Control Engineering (2003)	M. Gopal	New Age International
Modern Control Engineering (5th Edition, 2008-2009)	Katsuhiko Ogata	Pearson Education
Modern Control Systems (12th Edition, 2010)	Dorf & Bishop	Prentice-Hall of India
Control Systems Engineering (6th Edition)	Norman S. Nise	Wiley India

Web Material Link(s):

- <https://ctms.engin.umich.edu/CTMS/index.php?aux=Home>
- <https://www.mathworks.com/solutions/control-systems.html>
- <https://www.mtechprojects.com/control-systems.html>
- <https://www.scilab.org/>

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/Tutorial:

- Continuous Evaluation consists of the performance of tutorial, which will be evaluated out of 10 marks per each tutorial and the average of the entire tutorial will be converted to 20 marks.
- Internal viva/quiz/test consists of 20 marks.
- Tutorial performance/quiz/test consists 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

SEEC2040	Control Systems
CO 1	Analyze the behavior of control systems using time-domain and frequency-domain techniques to determine system stability and performance.
CO 2	Develop mathematical models and block diagram representations of physical systems and solve signal flow graphs to predict system response.
CO 3	Design basic compensators and PID controllers to improve system performance and achieve desired specifications.
CO 4	Apply state-space methods to represent and analyze single and multiple input-output systems, including controllability and observability concepts.
CO 5	Demonstrate understanding of sampled-data systems and Z-transform techniques to analyze and control discrete-time systems.

Mapping of CO with PO

SEEC2040	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	3	1	2	2	1	1	1	1	1	2
CO 2	3	3	2	2	2	1	1	1	1	1	2
CO 3	3	2	3	2	3	1	1	1	1	2	2
CO 4	3	3	2	2	2	1	1	1	1	1	2
CO 5	3	2	2	2	3	1	1	1	1	1	2

Mapping of CO with PSO

SEEC2040	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	3	2
CO 4	3	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	Basic components and classification of control systems, servomechanism, regulator, process control, and feedback systems characteristics.	1, 2
2	Mathematical modelling, transfer function, block diagram representation, signal flow graphs, and error analysis of control systems.	2, 3
3	Time response analysis of first and second order systems, steady state errors, sensitivity, and stability conditions.	2, 3, 4
4	Concept of root locus, rules for constructing root locus, and stability analysis using root locus.	3, 4, 6
5	Correlation between time and frequency response, polar plots, Bode plots, and stability margins.	2, 3, 4
6	Nyquist criteria, stability assessment, and realization of lead, lag, and lag-lead compensators.	3, 4, 5, 6
7	Proportional, integral, derivative, PI, PD, and PID controller characteristics.	2, 3, 5, 6
8	Sample and hold operations, Z-transform, block diagram analysis of sampled data systems, state-space representation, controllability and observability.	2, 3, 4, 6

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2050

Course Name: Electromagnetic Field 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	-	01	04	40	60	-	-	40	60	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Develop a strong understanding of vector calculus and its application to electric and magnetic fields.
- Analyze and solve problems in electrostatics, magnetostatics, and time-varying electromagnetic fields.
- Understand and apply Maxwell's equations for wave propagation and electromagnetic phenomena.
- Gain practical skills in simulating and visualizing electromagnetic fields and waves for engineering applications.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Vector Analysis and Coordinate Systems Vector relations in rectangular, cylindrical, spherical coordinates; Gradient, Divergence, Curl; Divergence theorem; Applications to electric and magnetic fields.	5	11
2.	Integral Theorems and Vector Identities Green's theorem, Stokes' theorem; Vector identities ($\nabla \cdot (\nabla \times A) = 0$, $\nabla \times (\nabla \phi) = 0$); Line, surface, volume integrals; Relation to Maxwell's equations.	4	9
3.	Electrostatics – Fundamentals Coulomb's Law, Superposition principle; Electric field intensity; Electric potential; Electric flux, flux density; Gauss's Law & simple applications; Capacitance basics.	5	11
4.	Electrostatics – Advanced Concepts Boundary conditions at dielectric & conductor interfaces; Poisson and Laplace equations; Method of images; Energy stored in capacitors.	6	13
5.	Magnetostatics Magnetic fields from current elements; Biot-Savart law & Ampere's circuital law; Magnetic flux density (B), Magnetic field intensity (H); Magnetic forces; Magnetic materials: permeability, classification; Inductance fundamentals.	6	13
6.	Time-Varying Fields and Maxwell's Equations Faraday's law; Displacement current; Maxwell's equations – integral & differential forms; Continuity equation; Simple introduction to EM wave existence.	6	13
7.	Electromagnetic Waves – Free Space and Media Uniform plane waves in free space and simple dielectric media; Wave impedance; Phase & group velocity; Skin effect (concept);	6	13

	Polarization (linear & circular only).		
8.	Wave Reflection, Transmission, and Power Considerations Reflection and transmission at normal incidence; SWR & Reflection coefficient; Poynting vector & power flow; Basic relevance to antennas and transmission lines (high-level).	7	17
	TOTAL	45	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Vector operations in rectangular, cylindrical, and spherical coordinates - problems	01
2.	Gradient, Divergence, Curl - physical interpretation & simple applications	01
3.	Divergence theorem & applications to electric/magnetic fields	01
4.	Green's theorem - examples and applications	01
5.	Stokes' theorem - examples and applications	01
6.	Vector identities in EM - verification problems	01
7.	Coulomb's Law & Electric field intensity calculations	01
8.	Relation between electric field and potential; electric flux & Gauss' law examples	01
9.	Boundary condition problems for conductor-dielectric interfaces	01
10.	Method of images and solving Laplace's/Poisson's equation problems	01
11.	Biot-Savart law & Ampere's law problems; magnetic field due to wires	01
12.	Magnetic vector potential & energy stored in magnetic fields; boundary condition problems	01
13.	Faraday's law & displacement current - problem-solving	01
14.	Maxwell's equations - integral and differential form problems; Poynting vector calculations	01
15.	Plane wave propagation, reflection & transmission, SWR, power flow problems	01
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Elements of Electromagnetics	Matthew N.O. Sadiku	Oxford University Press
Engineering Electromagnetics	W. H. Hayt	Tata McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Electromagnetic Waves & Radiating Systems	E.C. Jordan & K.G. Balmain	Prentice Hall
Fields and Wave Electromagnetics	David K. Cheng	Pearson
Electromagnetics	J.D. Kraus	Tata McGraw Hill

Web Material Link(s):

- <https://icphysweb.z13.web.core.windows.net/simulation.html>
- <https://www.openems.de/>
- <https://www.gprmax.com/>

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/Tutorial:

- Continuous Evaluation consists of the performance of tutorial, which will be evaluated out of 10 marks per each tutorial and the average of the entire tutorial will be converted to 20 marks.
- Internal viva/quiz/test consists of 20 marks.
- Tutorial performance/quiz/test consists 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

SEEC2050	Electromagnetic Field Theory
CO 1	Apply vector calculus and integral theorems to analyze electric and magnetic fields.
CO 2	Solve electrostatic field problems using potentials, boundary conditions, and Laplace/Poisson equations.
CO 3	Analyze magnetostatic fields using Biot-Savart law, Ampere's law, and magnetic potentials.
CO 4	Apply Maxwell's equations to time-varying fields and interpret wave propagation and power flow.
CO 5	Model and simulate electromagnetic waves, reflection, transmission, and polarization using computational tools.

Mapping of CO with PO

SEEC2050	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	3	2	2	2	1	1	1	2	1	2
CO 2	3	3	2	2	2	1	1	1	2	1	2
CO 3	3	3	2	2	2	1	1	1	2	1	2
CO 4	3	3	3	3	3	2	1	2	2	2	3
CO 5	3	3	3	3	3	2	1	2	3	2	3

Mapping of CO with PSO

SEEC2050	PSO1	PSO2	PSO3
CO 1	2	2	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	3	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	Vector Analysis & Coordinate Systems	1, 2, 3
2	Electrostatics & Electric Field Intensity	1, 2, 3, 4
3	Electric Potential & Boundary Value Problems	2, 3, 4
4	Conductors, Dielectrics & Capacitance	2, 3, 4
5	Magnetostatics & Magnetic Forces	1, 2, 3, 4
6	Magnetic Materials & Inductance	2, 3, 4
7	Maxwell's Equations & Time-Varying Fields	2, 3, 4, 5
8	Electromagnetic Wave Propagation & Power Flow	2, 3, 4, 5, 6

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2060

Course Name: Signals & Systems

Prerequisite Course(s): Engineering Mathematics

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 fundamental concepts of signals, systems, and their classifications.
- Analyze continuous-time and discrete-time signals in both time and frequency domains.
- Apply Fourier series, Fourier transforms, and Laplace transform in system analysis.
- Study LTI system properties, convolution, and system response.
- Use sampling theory and Z-transform for discrete-time signal processing applications.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Signals & Systems: Definition – Types of signals – Basic operations – Classification of systems – LTI systems – Properties	06	10
2.	Time-Domain Analysis of LTI Systems: Convolution – Impulse response – Differential & difference equations – System stability	07	15
3.	Fourier Series & Fourier Transform: Trigonometric & exponential Fourier series – Fourier transform – Properties – Applications	07	15
4.	Laplace Transform: ROC – Properties – Inverse Laplace transform – System transfer function – Stability analysis	06	15
5.	Continuous-Time Filters: Ideal vs practical filters – Low-pass, high-pass, band-pass, band-stop filters – Frequency response	04	10
6.	Sampling Theorem & Reconstruction: Sampling process – Aliasing – Sampling of analog signals – Reconstruction filters	05	10
7.	Z-Transform: Definition – ROC – Properties – Inverse Z-transform – System analysis using Z-transform	06	15
8.	Discrete-Time Fourier Transform (DTFT) & DFT: Definition – Properties – Fast Fourier Transform (FFT) introduction	04	10
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Basic operations on signals (time-scaling, shifting, folding)	02
2.	Study of LTI system properties	04
3.	Convolution (graphical & MATLAB/Python-based)	04
4.	Fourier series representation of signals	04
5.	Fourier transform using simulation tools	04

6.	Laplace transform & system response	04
7.	Sampling & reconstruction experiments	04
8.	Z-transform and inverse Z-transform using simulation	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Signals & Systems	Allan V. Oppenheim, A.S. Willsky	PHI
Signals & Systems	Simon Haykin, Barry Van Veen	Wiley

Reference Book(s):

Title	Author/s	Publication
Signals & Linear Systems	B.P. Lathi	Oxford University Press

Web Material Link(s):

- <https://nptel.ac.in/courses/108104045>
- <https://www.electronics-tutorials.ws>
- <https://www.allaboutcircuits.com>

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 the performance of practical, which will be evaluated out of 20 marks per each practical and the average of the entire practical will be converted to 10 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks.
- External viva consists of 30 marks.

Course Outcome(s):

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

SEEC2060	Signals & Systems
CO 1	Understand fundamental concepts of signals and systems.
CO 2	Analyze LTI systems using convolution and differential/difference equations.
CO 3	Apply Fourier & Laplace techniques for signal and system analysis.
CO 4	Use sampling theorem and Z-transform effectively in discrete-time analysis.
CO 5	Evaluate frequency-domain behavior of signals using FT, DTFT, and DFT.

Mapping of CO with PO

SEEC2060	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	1	1	1					1	
CO 2	3	3	2	2	2					1	1
CO 3	3	2	3	2	3					2	1
CO 4	3	3	2	3	3					1	1
CO 5	2	3	2	3	3					1	1

Mapping of CO with PSO

SEEC2060	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	3	2	2
CO 3	3	3	2
CO 4	3	3	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 Signals & Systems	1,2
2	Time-domain analysis	2,3
3	Fourier series & transform	2,4
4	Laplace transform	2,4
5	Filters	2,3
6	Sampling & reconstruction	2,3,4
7	Z-transform	3,4
8	DTFT & DFT	2,3,5

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2070

Course Name: Microprocessor & Microcontroller

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	
04	02	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- To understand the architecture and functioning of microprocessors/microcontrollers.
- To develop basic and advanced assembly language programming skills.
- To learn interfacing techniques using peripheral devices and memory units.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Basics of Microprocessors: Introduction to Microprocessors, microcontroller; 8085 Microprocessor Architecture, pin description, Bus concept and organization; concept of multiplexing and de-multiplexing of buses	06	10
2.	Instruction Set & Assembly Programming: Classification of instruction, Instruction set, addressing modes, Assembly Language Programming and Debugging, Programming Technique, instruction Format and timing. Basics of assembly language programming	06	10
3.	Advanced Programming Techniques in 8085: Counter and time delay; types of Interrupts and their uses, RST instructions and their uses, 8259 programmable interrupt controllers; Macros, subroutine; Stack implementation and uses with examples; Memory interfacing.	08	13
4.	Interfacing with Peripheral Devices: 8237 DMA Controller, 8255 PPI, 8253/54 Timer & Counter, 8259 PIC, 8251 USART, RS232C	06	10
5.	Microprocessor Application: Interfacing scanned multiplexed display and liquid crystal display, Interfacing and Matrix Keyboard, MPU Design; USART 8251, RS232C and RS422A, Parallel interface Centronics and IEEE 488.	08	13
6.	8051 Microcontroller Architecture: Introduction to Microcontroller - Microcontroller Vs Microprocessor - 8051 Microcontroller architecture - 8051 pin description. Timers and Counters - Operating Modes Control Registers. Interrupts - Interrupts in 8051 - Interrupts Control Register - Execution of interrupt.	08	13
7.	Applications of Microprocessor & Microcontroller: LED, LCD and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing	07	12

8.	8051 Programming in C: Data types in 8051 C, programming for time delay, I/O programming in 8051 C, Logic operations in 8051 C, Control statements and loops in embedded C.	11	19
TOTAL		60	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Study of 8085 Microprocessor Architecture & Pin Diagram	02
2.	Study of Basic 8085 Instructions (Data Transfer, Arithmetic, Logical)	02
3.	Assembly Program on 8085: Addition, Subtraction, Multiplication	04
4.	8085 Programming: Looping, Counting & Indexing	02
5.	Interfacing LEDs & Switches with 8085 (Simple I/O Interfacing)	04
6.	Peripheral Interfacing: 8255 PPI / 8253 Timer	04
7.	8051 Microcontroller: Assembly Programming Basics	04
8.	8051 Timers and Serial Communication Programming	04
9.	8051 Interfacing with LCD / Keypad / ADC / DAC	04
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Microprocessor Architecture Programming and Applications	Ramesh Gaonkar	Penram International Publishing
The 8051 microcontroller and embedded systems using Assembly and C	Mohamed Ali Mazidi, Janice Gillispie Mazidi	Pearson

Reference Book(s):

Title	Author/s	Publication
Fundamentals of Microprocessors and Microcontrollers	B Ram	Dhanpat Rai Publications

Web Material Link(s):

- <https://onlinecourses.nptel.ac.in/>
- <https://www.ibm.com/>
- <https://mpbou.edu.in/>

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 the performance of practical, which will be evaluated out of 20 marks per each practical and the average of the entire practical will be converted to 10 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks.
- External viva consists of 30 marks.

Course Outcome(s):

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

SEEC2070	MICROPROCESSOR & MICROCONTROLLER
CO 1	Understand 8085 and 8086 architecture and operations.
CO 2	Apply 8085/8086 instructions to write assembly programs.
CO 3	Demonstrate interfacing and programming of peripherals (8255, 8253, 8259, 8251).
CO 4	Understand 8051 architecture, memory, and addressing modes.
CO 5	Develop basic 8051 programs and interface peripherals like LCD, keypad, ADC, and DAC.

Mapping of CO with PO

SEEC2070	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	1	1	1					1	
CO 2	3	3	2	2	1					1	
CO 3	3	2	3	2	2					1	
CO 4	3	2	1	1	1					1	
CO 5	3	2	3	2	2					1	1

Mapping of CO with PSO

SEEC2070	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	3	2	2
CO 3	3	3	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	Basics of Microprocessors	1, 2
2	Microprocessor Interfacing Techniques	3
3	Instruction Set & Assembly Programming	2, 3
4	Advanced Programming Techniques in 8085	4
5	8086 Architecture and Addressing	2
6	Peripheral Devices and Interfacing	3, 4
7	8051 Microcontroller Architecture	2, 3
8	8051 Programming and Applications	5, 6

**P P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2510

Course Name: Power Electronics

Prerequisite Course(s): Network Analysis & Synthesis (SEEE2210) and Digital Circuits & System Design (SEEC2021)

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

- Understand the characteristics, operation, and protection of modern power semiconductor devices.
- Analyze and evaluate various power conversion circuits including AC-DC, DC-DC, and DC-AC converters.
- Apply design and control techniques for inverters, choppers, and PWM-based power electronic systems.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Solid State Power Devices & Operation SCR, Power Transistor, MOSFET, Thyristors, GTO, Classification of SCR triggering methods, Design and operation of triggering circuits	04	10
2.	Commutation Methods & SCR Protection Commutation methods, Pulse transfer and isolation scheme, Protection of power devices, Series and parallel operation of SCRs	04	12
3.	Phase-Controlled (AC to DC) Converters - Single Phase Single-phase midpoint and full-wave converters, Uncontrolled, half-controlled, and fully controlled bridge rectifiers, Input/output waveforms	04	12
4.	Phase-Controlled (AC to DC) Converters - Three Phase Three-phase half-controlled bridge, Three-phase fully controlled bridge, Average output voltage and basic waveforms	02	10
5.	DC-DC Converters (Choppers) Introduction, Classification, Principle and Operation, Control strategies, Chopper configurations, switched mode power supply: step down (buck), Step up (boost) and step down/step up (buck/boost) converters	04	14
6.	DC to AC Converters (INVERTERS) Single-phase A.C. Regulators-different circuit configuration and their operation	04	15
7.	Voltage Source Inverters Single-phase and Three-phase bridge converter operating as line-commutated voltage source inverters, force commutated inverters	04	12
8.	Pulse width modulated inverters Pulse width modulated inverters with IGBTs/MOSFETs, Gate driving Circuit, Dead-time, Design of Snubber Circuit, Current source inverter	04	15

	TOTAL	30	100
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List of Practical:

Sr. No.	Name of Practical	Hours
1.	Performance of SCR using IC 2N4103or any other equivalent IC	02
2.	Measurement of output voltage by changing firing angle through variation in resistor, capacitor in R and RC triggering circuits of SCR.	04
3.	Half wave-controlled rectifier	02
4.	Performance of full wave-controlled rectifier with R, R _L load and measure load voltage.	04
5.	Performance of 3- phase half wave-controlled rectifier	04
6.	Performance of step-up chopper for different values of duty cycles	04
7.	*Step-down chopper for R and R _L load	02
8.	Performance of parallel inverter	04
9.	Emergency Light circuit using SCR	02
10	Temperature controller using SCR	02
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Power Electronics Circuits, Devices and Applications	Mohammad H. Rashid	Prentice Hall of India Pvt. Ltd.
Power Electronics: Principles and Applications	Joseph Vithayathil,	Tata McGraw-Hill Education
Power electronics: converters, applications, and design	Ned Mohan, Tore M. Undeland,	John Wiley & Sons.

Reference Book(s):

Title	Author/s	Publication
Power Electronics – Devices, Converters and Applications	Vedam Subramanyam	Revised 2nd edition, New Age Publications
Power Electronics, Converters, Applications and Design	Ned Mohan, Tore M. Undeland, William P. Robbins	Wiley
Thyristor Phase Controlled Converters and Cycloconverters	B. R. Pelly	John Willey & Sons.

Web Material Link(s):

- <https://in.mathworks.com/discovery/power-electronics-simulation.html>
- <https://www.ansys.com/en-in/applications/power-electronics>
- <https://www.plexim.com/products/plecs>
- <https://simba.io/>
- <https://matlabprojects.org/power-electronics-simulation-projects/>

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/Tutorial:

- Continuous Evaluation consists of performance of Practical/Tutorial 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/drawing/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

SEEC2510	Power Electronics
CO 1	Explain the characteristics, operation, triggering, and protection of modern power semiconductor devices
CO 2	Analyze commutation techniques and design reliable triggering and protection circuits for SCR-based systems.
CO 3	Evaluate the performance of single-phase and three-phase controlled AC-DC converters using voltage and waveform analysis.
CO 4	Apply DC-DC chopper and AC regulator principles to control output power for various applications.
CO 5	Design and optimize PWM-based inverter and cycloconverter circuits with proper gate driving, dead-time, and snubber techniques.

Mapping of CO with PO

SEEC2510	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2			2			1			2
CO 2	3	3	2	2	2			1			2
CO 3	3	3	2	1	3	1					2
CO 4	3	2	3	1	3	1		1		1	2
CO 5	3	3	3	2	3	1	1	1	1	1	3

Mapping of CO with PSO

SEEC2510	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	3	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 Solid State Power Devices & Operation	1, 2, 3
2	Commutation Methods & SCR Protection	2, 3, 4
3	Phase-Controlled (AC to DC) Converters – Single Phase	2, 3, 4
4	Phase-Controlled (AC to DC) Converters – Three Phase	2, 3, 4, 5
5	DC-DC Converters (Choppers)	2, 3, 4
6	DC to AC Converters (INVERTERS)	2, 3, 4
7	Voltage Source Inverters	3, 4, 5
8	Pulse width modulated inverters	3, 4, 5, 6

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SEEC2520

Course Name: Fundamentals of Nanotechnology

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	-	03	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Understand the fundamental concepts and principles of nanoscience and nanotechnology.
- Explore different types, synthesis methods, and characterization techniques of nanomaterials.
- Apply nanotechnology concepts to real-world applications in electronics, medicine, energy, and environment.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Nanoscience and Nanotechnology: Definition, history, nanoscale dimensions – Quantum size effects – Surface-to-volume ratio – Scope & interdisciplinary nature.	04	12
2.	Types of Nanomaterials: 0D, 1D, 2D, 3D nanostructures – Carbon nanomaterials (CNTs, fullerenes, graphene) – Metal, semiconductor, polymeric nanomaterials.	04	12
3.	Synthesis of Nanomaterials (Top-Down & Bottom-Up): Mechanical milling, lithography – Chemical vapor deposition (CVD) – Sol-gel method – Self-assembly – Biological synthesis	04	12
4.	Characterization Techniques: SEM, TEM, AFM, STM – XRD, UV-Vis, FTIR, Raman spectroscopy – Particle size analysis.	04	10
5.	Nanofabrication and Nanoelectronics: Nano-lithography methods – Quantum dots, nanowires, nano sensors – Applications in electronics, computing & photonics	04	15
6.	Nanotechnology in Medicine and Biotechnology: Drug delivery systems – Biomedical imaging – Biosensors – Tissue engineering & regenerative medicine.	04	15
7.	Nanotechnology in Energy & Environment: Nanomaterials for solar cells, batteries, fuel cells – Water purification – Pollution control – Environmental remediation.	02	12
8.	Safety, Ethical Issues, and Applications: Nanotoxicology – Health & environmental impacts – Ethical and regulatory concerns – Future trends & industrial applications	04	12
	TOTAL	30	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to nanomaterials & safety	02
2.	Synthesis of metal nanoparticles	04
3.	Sol-gel synthesis of oxide nanoparticles	04
4.	UV-Vis characterization	04
5.	Particle size analysis	04
6.	Study of SEM/TEM images	04
7.	Sensor-based nanotechnology experiment	04
8.	Mini-project	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Nanotechnology: Principles and Practices	S.K. Kulkarni	Springer
Introduction to Nanotechnology	Poole & Owens	Wiley

Reference Book(s):

Title	Author/s	Publication
Nanostructures & Nanomaterials	Guozhong Cao	World Scientific
Nanotechnology: A Gentle Introduction	Ratner & Ratner	Pearson

Web Material Link(s):

- <https://nanohub.org>
- <https://www.understandingnano.com>
- <https://www.nano.gov>

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 the performance of practical, which will be evaluated out of 20 marks per each practical and the average of the entire practical will be converted to 10 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks.
- External viva consists of 30 marks.

Course Outcome(s):

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

SEEC2520	FUNDAMENTALS OF NANOTECHNOLOGY
CO 1	Understand fundamental nanoscale principles and quantum effects.
CO 2	Identify and classify nanomaterials and synthesis methods.
CO 3	Interpret characterization data from nanomaterial analysis tools.
CO 4	Apply nanotechnology concepts to solve problems in various domains.
CO 5	Evaluate ethical, environmental, and safety issues in nanotechnology.

Mapping of CO with PO

SEIT3022	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	1	1	2		2				
CO 2	3	3	2	2	3				1		
CO 3	3	2	3	2	3				2		
CO 4	3	3	2	3	3						1
CO 5	2	3	2	3	3						1

Mapping of CO with PSO

SEEC2520	PSO1	PSO2	PSO3
CO 1	2	1	2
CO 2	2	2	2
CO 3	3	2	2
CO 4	3	2	3
CO 5	1	1	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 Nanotechnology	1, 2
2	Types of Nanomaterials	1, 2
3	Synthesis	2, 3
4	Characterization	2, 3, 5
5	Nanofabrication	3, 4, 6
6	Nanomedicine	1, 2
7	Energy & Environment	3, 6
8	Ethics & Applications	3, 6

**P Savani University
School of Engineering**

Department of Electronics & Communication Engineering

Course Code: SEEC2530

Course Name: Introduction to Drone Technology

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	00	03	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Understand about the goal of the Drone Technology.
- Understand the Components of Drone.
- Familiarize the students with the concepts and techniques used in design of a small drones and its applications.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Drones: Definition and history of drones, Types of drones and their applications	04	12
2.	Drone Regulations & Safety: DGCA guidelines, drone classifications, safety protocols, legal aspects	04	10
3.	Drone Components: Basic components, Airframe, motors, ESC, propellers, controllers, batteries, camera units	04	12
4.	Drone Design Principles: Airframe design considerations, basics of propulsion system	03	10
5.	Drone Assembly Techniques: Selecting components, assembling motors, controllers, wiring, soldering	03	10
6.	Drone Motors & ESC: Working, Types, Brush/brushless motors, KV rating, thrust-to-weight ratio, ESC function	04	14
7.	Flight Mechanics & Dynamics: Basic principles of flight mechanics, flight controller board, Selection of drone controller with example, Factors affecting drone flight performance and efficiency	04	16
8.	Drone Applications: Overview of commercial and industrial drone applications, Case studies and examples of successful drone deployments, GPS based navigation system, Drone Camera Systems, Agro application, Drone Delivery, Future trends and developments in the drone industry.	04	16
TOTAL		30	100%

List of Practical:

Sr. No	Name of Practical	Hours
1	Study of Drone Frame	02
2	Study of Motor	04
3	Study of ESC	04
4	Study of Flight Controller	04
5	Learn Soldering Techniques for Drone	04
6	Assembling Drone	06
7	Drone Flight Control	06
	TOTAL	30

Text Book (s):

Title	Author/s	Publication
Building Drones for Dummies	M. LaFay	John Wiley & Sons
Practical Drones: Building, Programming, and Applications	E. Tooley	Apress

Reference Book (s):

Title	Author/s	Publication
Getting Started with Drone: How to Build, Fly, and Program Your Own Drone	D. McLeod	Apress
Drone Technology: Theory and Practice	S. K. Kopparchy	Springer

Web Material Link(s):

- <https://onlinecourses.nptel.ac.in/>

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 Cour 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:

SEEC2530	INTRODUCTION TO DRONE TECHNOLOGY
CO 1	Understand fundamentals of UAV types, components & aerodynamics
CO 2	Analyze flight controllers, propulsion systems & stability mechanisms
CO 3	Apply drone operation procedures, mission planning & safety norms
CO 4	Demonstrate maintenance, troubleshooting & calibration of drones
CO 5	Utilize drones for real-time applications like agriculture, surveillance & mapping

Mapping of CO with PO

SEEC2530	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	2	1	1					1	
CO 2	3	3	2	2	1					1	
CO 3	2	2	3	2	1	1	2	2	1	2	1
CO 4	2	1	3	2	2		1	1	2	2	1
CO 5	2	2	3	3	2	1	2	2	2	2	1

Mapping of CO with PSO

SEEC2530	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	3	3	2
CO 3	2	3	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	Introduction to Drones	1,2
2	Drone Regulations & Safety	2,3
3	Drone Components Overview	1,2,3
4	Drone Design Principles	2,4
5	Drone Assembly Techniques	3,4
6	Motors & ESC	2,3,4
7	Flight Mechanics & Dynamics	2,4,5
8	Drone Applications	2,3,5,6