Syllabus Book

B. Tech

Civil (Sustainable)

Engineering

P P Savani University

School of Engineering

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

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL (SUSTAINABLE) 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**	
Group 1	SESH1110	Calculus	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SEME1210	Basics of Mechanical Engineering	ME	3	0	2	5	5	40	60	0	0	100	0	200
	SEIT1210	Python for Engineers	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SESH1130	Experimental Physics	SH	3	2	0	5	4	40	60	40	60	0	0	200
	CFLS2130	Intermediate Communicative English	CFLS	3	0	0	3	3	40	60	0	0	0	0	100
						Total	**29**	**26**							**900**
Group 2	SESH1120	Linear Algebra	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SECV1210	Basics of Civil Engineering	CV	3	0	2	5	5	40	60	0	0	100	0	200
	SECE1210	Programming with C Essentials	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SEEC1210	Basics of Electrical and Electronics	EC	3	2	0	5	4	40	60	40	60	0	0	200
	SEME1220	Engineering Workshop	ME	0	2	0	2	2	0	0	40	60	0	0	100
	SECE1220	Digital Proficiency	IT	3	0	0	3	3	40	60	0	0	0	0	100
						Total	**23**	**19**							**1000**

P P Savani University
School of Engineering

Department of Science and Humanities

Course Code: SESH1110
Course Name: Calculus
Prerequisite Course/s: Algebra, Geometry, Trigonometry & Pre-Calculus till 12th Standard level

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

Course Content:

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

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

List of Tutorials:

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

Text Book:

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

Reference Book:

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

Course Evaluation:

Theory:

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

Tutorial:

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

- Internal Viva consists of 30 marks.

Course Outcome(s):

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

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

Mapping of CO with PO

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

Mapping of CO with PSO

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

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

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

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

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME1210
Course Name: Basics of Mechanical Engineering
Prerequisite Course(s): -- None

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- study the fundamentals of mechanical systems.
- study and appreciate significance of mechanical engineering in different fields of engineering.
- carry out simple land survey and recent trends in civil engineering.
- understand components of building, building terminology and construction materials.

Course Content:

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

Module No.	Content	Hours	Weightage in %
5.	**Basic Concepts of Thermodynamics:** Prime Movers - Meaning and Classification; the Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific Heat Capacity, Internal Energy, Specific Volume; Thermodynamic Systems, All Laws of Thermodynamics	04	09
6.	**Basics of I.C Engines:** Construction and Working of 2 Stroke & 4 Stroke Petrol andDiesel Engines, Difference Between 2-Stroke - 4 Stroke Engine & Petrol-Diesel Engine, Efficiency of I. C. Engines	08	18
7.	**Power Transmission Elements:** Construction and Applications of Couplings, Clutches and Brakes, Difference Between Clutch and Coupling, Types ofBelt Drive and Gear Drive	06	18
	TOTAL	45	100

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

- http://nptel.ac.in/courses/105107157/
- http://nptel.ac.in/courses/105101087/
- http://nptel.ac.in/courses/105107121/
- http://nptel.ac.in/courses/105104100/

Course Evaluation:

Theory:

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

Tutorial

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

Course Outcome(s):

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

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

Mapping of CO with PO

SECV1040	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	1	3	2	2						3
CO 2	2	3	1	3	2	2						3
CO 3	1	3	1	3	2	2						3
CO 4	1	3	1	3	2	2						3

Mapping of CO with PSO

SECV1040	PSO1	PSO2	PSO3
CO 1	2	2	2
CO 2	2	2	2
CO 3	3	2	2
CO 4	3	2	2

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

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

Module No	Content	RBT Level
1	Introduction to Boiler	1, 2, 3
2	Classification of Engineering Materials	1, 2
3	Fluids	1, 2

4	Measurement	1, 2
5	Basics Concept of Thermodynamics	1, 2, 3
6	Basics of I.C. Engines	1, 2
7	Power Transmission Elements	1, 2

P P Savani University
School of Engineering
Department of Computer Engineering

Course Code: SEIT1210
Course Name: Python for Engineers
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the basic object-oriented programming.
- identify an appropriate approach to solve computational problems.
- develop logic building and problem-solving skills.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Python** History, Features of Python, Applications of Python, Working with Python, Input and Output Functions in Python, Variable, Assignment, Types, Basic Operators, Expressions and Types of Data Int, Float, Complex, String, List, Tuple, Set, Dictionary and its Methods, Type Conversions, Comments, Input Processing and output.	04	07
2.	**Decision Structures in Python** Conditional Blocks Using if, Else and Else If, Simple for Loops in Python, For Loop Using Ranges, String, List and Dictionaries Use of While Loops in Python, Loop Manipulation Using Pass, Continue, Break and Else	04	07
3.	**Array and Strings in Python** Arrays, Basic Strings, Accessing Strings, Basic Operations, String Slicing, Testing, Searching and Manipulating Strings, Function and Methods.	03	08
4.	**Dictionary, List, Tuples and Sets** Dictionaries, Accessing Values in Dictionaries, Working with Dictionaries, Properties, Functions and Methods. Sets, Accessing Values in Set, Working with Set Properties, Functions and Methods, Tuple, Accessing Tuples, Operations, Working, Functions and Methods. List, Accessing List, Operations, Working With Lists, Function and methods, two-dimensional lists.	06	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	07	14

	Local Variables, Importing Module, Math Module, Random Module, Introduction to Packages: Numpy, Pandas, Matplotlib.		
Section II			
Module No.	Content	Hours	Weightage in %
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.	07	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.	04	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	04	09
9.	**Building Desktop Application** Exploring the Tkinter Library in Python, Creating basic Desktop application using Tkinter	06	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, Tuples and Lists and its various methods in Python.	06
4.	Working with decision structures in Python	04
5.	Working with functions and modules in Python	02
6.	Working with Object-oriented paradigms in Python	04
7.	Implementation of file handling in Python.	02
8.	Exception handling in Python	02
9.	Building desktop application of your own calculator in Python.	02
	TOTAL	30

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

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

Mapping of CO with PO

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

Mapping of CO with PSO

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

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction to Python	1,2,4
2.	Decision Structures in Python	1,2,3
3.	Array and Strings in Python	1,2,3
4.	Dictionary, List, Tuples and Sets	2,3,4
5.	Functions, Modules and Packages in Python	2,3,4
6.	Python Object Oriented Programming	3,4,6
7.	Files & Regular Expression in Python	3,4.6
8.	Exception Handling in Python	3,4,5
9.	Building Desktop Application	2,3,4

P P Savani University
School of Engineering

Department of Science and Humanities

Course Code: SESH1130
Course Name: Experimental Physics
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

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

Course Content:

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

	LASER – Introduction, Characteristics, Absorption, Spontaneous and stimulated emission; metastable state, population inversion, Pumping mechanism, components of LASER; Nd:YAG Laser, Applications of LASER. FIBRE OPTICS – Introduction, Optical Fiber construction, working principle and types, Numerical Aperture, Acceptance angle and Attenuation, Fiber optic communication system, Applications of Optical Fiber.		

Section II			
Module No.	**Content**	**Hours**	**Weightage in %**
1	**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
2	**SUPERCONDUCTORS AND SUPERCAPACITORS** (Prerequisites: Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current, Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical resistivity and conductivity temperature dependence of resistance). Superconductors: Introduction, Critical temperature, Properties of superconductors, Type of superconductors: Type I and Type II and high Tc superconductors, Applications: Magnets, Josephson effect, SQUID, Maglev, other. Supercapacitors: Principle, construction, materials and applications, comparison with capacitor and batteries : Energy density, Power density.	08	18
3	**SEMICONDUCTOR PHYSICS AND TECHNOLOGY** (Prerequisites: Intrinsic and extrinsic semiconductors, Energy bands in conductors, semiconductors and insulators, Semiconductor diode, I-V characteristics in forward and reverse bias) Direct & indirect band gap semiconductor; Fermi level; Fermi energy level in intrinsic & extrinsic semiconductors; effect of impurity concentration and temperature on fermi level; mobility, current density; Hall Effect; Fermi Level diagram for p-n junction (unbiased, forward bias, reverse bias); Applications of semiconductors: LED, Zener diode, Photovoltaic cell.	09	18

List of Practical:

Sr. No.	**Name of Practical**	**Hours**
1.	Analysis of errors.	04
2.	To measure diameter of a small spherical body using Vernier calipers and hence find its volume.	04

3.	To measure the diameter of given object using micrometer screw gauge.	04
4.	Verify ohm's law using ammeter and voltmeter.	04
5.	To study the series and parallel connections of resistors.	02
6.	To study the series and parallel connections of capacitors.	02
7.	I-V characteristics of Light Emitting diode (LED).	02
8.	I-V characteristics of Zener diode.	04
9.	To determine Numerical aperture and acceptance angle of an optical fiber.	04

Text Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SESH1130	EXPERIMENTAL PHYSICS
CO 1	Understand the framework of quantum mechanics and apply the knowledge of basic quantum mechanics to construct one dimensional Schrodinger's wave equation.
CO 2	Classify the phenomenon of acoustics and ultrasonic in various engineering field and apply it for various engineering and medical fields.
CO 3	Describe the laser and articulate the idea of optical fiber communications and apply the concepts of lasers and optical fiber communications in every possible sector.
CO 4	Interpret the concept of Nanotechnology and understand the synthesis and applications of Nanomaterials from technological prospect. Discover the types and properties of Superconductors. Relate the behavior of superconductors at high temperatures

CO 5	Distinguish pure, impure semiconductors and characteristics of semiconductor devices. Thus, will be able to use basic concepts to analyze and design a wide range of semiconductor devices.

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

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

Module No	Content	RBT Level
1	Quantum Physics	2
2	Acoustic and Ultrasonic	3
3	Laser and Fibre Optics	2,3
4	Nanoscience and Nanotechnology	2,3,6
5	Superconductors and Supercapacitors	1, 2,3
6	Semiconductor Physics and Technology	1,6

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH1120 Course
Name: Linear Algebra
Prerequisite Course/s: -- Algebra, Geometry, Trigonometry &Pre-Calculus till 12th Standard level

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Matrix Algebra** Elementary Row and Column operations, Inverse of matrix, Rank of matrix, System of Linear Equations, Characteristic Equation, Eigen values and Eigen vector, Diagonalization, Cayley Hamilton Theorem.	12	30
2.	**Vector Space** Concept of vector space, Subspace, Linear Combination, Linear Dependence and Independence, Span, Basis and Dimension, Row Space, Column Space and Null Space, Rank and Nullity.	11	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Linear Transformation** Introduction of Linear Transformation, Kernal and Range, Rank and Nullity, Inverse of Linear Transformation, Rank Nullity Theorem, Composition of Linear Maps.	09	20
2.	**Inner Product Space** Inner Product, Angle and Orthogonality, Orthogonal projection, Gram-Schmidt process and QR Decomposition, least square decomposition.	08	20
3.	**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 Chrish Rorres	Wiley

Reference Book(s):

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

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

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

Mapping of CO with PO

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

Mapping of CO with PSO

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

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

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

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

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective of the Course:
To help learners to
- Understand components of building, building terminology and construction materials.
- Understand building layout plan.
- Understand latest trends in civil engineering.
- Understand importance of various construction equipment.

Course Content:

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

5.	**INTRODUCTION TO SURVEYING AND LEVELLING:** Introduction: Fundamental principles, Classification. Linear measurement: Instruments used, Chaining on plane ground, Offset, Ranging. Angular measurement: Compass-Instrument used, Meridian, 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 scarper, 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.	Videosshowing working of construction Equipments.	04
10.	Presentation on various topics as in module 7 about recent trends.	04
	TOTAL	30

Text Book(s):

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

Reference Book(s):

Title	Author/s	Publication
Elements of civil engineering	Dr. R. K. Jain and Dr. P. P. Lodha	McGraw Hill Education

Basics of civil engineering	S.S. Bhavikatti	New age international Publishers

Web Material Links:

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

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

Mapping of CO with PO

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

Mapping of CO with PSO

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

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

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

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

P P Savani University
School of Engineering
Department of Computer Engineering

Course Code: SECE1210
Course Name: Programming with C Essentials
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
3	4	0	5	40	60	40	60	0	0	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the basic components of a computer system.
- identify an appropriate approach to computational problems.
- develop logic building and problem-solving skills.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
10.	**Introduction to Computers Programming:** Introduction to programs, its significance, classification of programming language, Selection of a programming language, Flow Charts and Algorithms.	04	10
11.	**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.	06	15
12.	**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 Associatively. Introduction to Reading a Character, Writing a Character, Formatted Input and Output.	05	10
13.	**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.	07	15
Section II			

Module No.	Content	Hours	Weightage in %
14.	**Arrays:** Introduction, One-dimensional Arrays, Two-dimensional Arrays, Concept of Multidimensional Arrays.	05	12
15.	**Strings:** Declaring and Initializing String Variables, Arithmetic Operations on Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions.	04	10
16.	**User-Defined Functions:** Concepts of User-defined Functions, Prototypes, function Definition, Parameters, Parameter Passing, Calling a Function, Recursive Function.	04	10
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
10.	Introduction to Unix Commands (creating a folder, creating a file, deleting a file, renaming files, copy a file from one location to another, listing entire directories and files, list directories, listing files, moving files from one location to another)	02
11.	Introduction to C programming environment, compiler, Linker, loader, and editor.	02
12.	Working with basic elements of C languages (different input functions, different output functions, different data types, and different operators)	06
13.	Working with C control structures (if statement, if-else statement, nested if-else statement, switch statement, break statement, goto statement)	06
14.	Working with C looping constructs (for loop, while loop, do-while and nested for loop)	10
15.	Working with the array in C (1-D array, and 2-D array)	04
16.	Working with strings in C (input, output, different string inbuilt functions)	04
17.	Working with user-defined functions in C (function with/without return type, function with/without argument, function and array)	06
18.	Working with recursive function in C	02
	TOTAL	60

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=3QiItmIWmOM

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, and strings in C for efficient data manipulation and code modularity.

Mapping of CO with PO

SECE1210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PO12
CO 1	3	3	1	1								1
CO 2	3	2	1									1
CO 3	3	2	1	1								
CO 4	3	2	1									1
CO 5	3	3	1		1							1

Mapping of CO with PSO

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

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	**Content**	**RBT Level**

1.	Introduction to Computers Programming:	1,2
2.	Introduction to C, Constants, Variables and Data Types	1,2,3
3.	Operators, Expressions, and Managing I/O Operations	3,4
4.	Conditional Statements	2,3,4
5.	Arrays	2,3
6.	Strings	2,3
7.	User-Defined Functions	2,3,4

P P Savani University
School of Engineering

Department of Science and Humanities

Course Code: SEEC1210
Course Name: Basics of Electrical and Electronics
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

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

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1	**Basic Introduction to Electricity and Magnetism** Concept of Charge, Coulomb's law, Electric Field, Intensity of electric field, Electric lines of force, Properties of electric lines of force, Electric flux, Flux density, Potential Difference and Current, Concept of Magnetic field, Coulomb's law of magnetic force, Magnetic Lines of Force, Magnetic flux.	11	24
2	**DC Circuits and Electromagnetism** Electrical circuit elements (R, L and C): Resistor, capacitor, Inductor, Voltage and Current sources, Ohm's law, effect of Temperature on resistance, temperature coefficient, Series and parallel combinations of Resistors and capacitors, Kirchoff's current and voltage laws, Thevenin and Norton Theorems. Ampere's law, Lenz and Faraday's laws for electromagnetic induction, Self inductance, Mutual inductance. Examples	12	26

Section II			
Module No.	**Content**	**Hours**	**Weightage in %**
1	**AC Circuits** Representation of sinusoidal waveforms, peak and RMS values, Phasor representation of AC quantities, real power, reactive power, apparent power, power factor, Three phase balanced circuits, voltage	11	25

	and current relations in star and delta connections, Power measurement in three phase circuits. Examples		
2	**Electronics** Classification of Solids: Energy levels in solids, Semiconductors, Intrinsic and Extrinsic Semiconductor, N-type & P-type semiconductors, P-N junction diode, Characteristics of P-N junction diode, Types of Diodes: Photo diode, Light Emitting Diode, Solar cell, PIN diode, Varactor diode, Zener diode, Advantages of Semiconductor Devices.	11	25

List of Practical:

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

Text Book(s):

Title	Author/s	Publication
Basic electrical engineering	T.N. Nagsarkar and M.S. Sukhija	Oxford University Press, 3rd 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, 7th edition.
Electronic Devices and Circuits	David A. Bell	Oxford University Press, 5th edition

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

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

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

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

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

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME1220
Course Name: Engineering Workshop
Prerequisite Course(s): -- 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	
-	02	-	02	-	-	40	60	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

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

Course Outcome(s):
After the completion of the course, the following course outcomes will be able to:

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

Mapping of CO with PO

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

Mapping of CO with PSO

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

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

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

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

P P Savani University
School of Engineering
Department of Computer Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- provide foundational knowledge of digital tools and technologies.
- introduce the principles of digital communication, collaboration, and problem-solving.
- enhance awareness of emerging digital trends and their applications in engineering.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
17.	**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
18.	**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
19.	**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
20.	**Computational Problem-Solving** Introduction to algorithms and flowcharts. Solving simple engineering problems through programming. Applications of computational techniques in various engineering domains.	06	12
Section II			
Module No.	Content	Hours	Weightage in %
21.	**Cybersecurity and Ethical Practices**	05	12

	Understanding cybersecurity principles, Awareness of phishing, malware, and secure passwords, Digital footprints and privacy concerns, Ethical use of technology and copyright considerations.		
22.	**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
23.	**Emerging Technologies and Industry Trends** Overview of Industry 4.0 concepts: IoT, AI, Robotics, and Blockchain. Applications of emerging technologies in various engineering domains. Case studies: Smart cities, sustainable manufacturing, and automation. Preparing for future technological trends and job roles.	07	15
24.	**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=PLlKpQrBME6xLGL3Ty_1Wbd3nTZ_q_OKFQ

Course Evaluation:

Theory:

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

Course Outcome(s):

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

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

Mapping of CO with PO

SECE1220	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3		1	3				2	3		1
CO 2	3	2			3					3		1
CO 3	3	2	1	3	3							1
CO 4	3	2				3		3				1
CO 5	3	3	1		3						3	1

Mapping of CO with PSO

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

Level of Revised Bloom's Taxonomy in Assessment

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

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

P P SAVANI UNIVERSITY																
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TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL (SUSTAINABLE) 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**	
3	SECV2260	Basics of Sustainable Energy	CV	3	0	2	5	5	40	60	0	0	100	0	200
	SEEE2010	Energy Storage & Technology	EE	3	0	2	5	5	40	60	0	0	100	0	200
	SECV2270	Strength of Materials	CV	3	2	1	6	5	40	60	40	60	50	0	250
		Elective-I	CV	3	2	0	5	4	40	60	40	60	0	0	200
		Elective-II	CV	3	2	0	5	4	40	60	40	60	0	0	200
						Total	**26**	**23**							**1050**
4	SEME2360	Entrepreneurship in Energy Sector	ME	3	0	2	5	5	40	60	0	0	100	0	200
	SEME2370	Energy Efficiency, Audit & Management	ME	3	0	2	5	5	40	60	0	0	100	0	200
	SECV2360	Sustainable and Green Transportation	CV	3	2	0	5	4	40	60	40	60	0	0	200
		Elective-I	CV	3	2	0	5	4	40	60	40	60	0	0	200
		Elective-II	CV	3	2	0	5	4	40	60	40	60	0	0	200
						Total	**25**	**22**							**1000**

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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**		
5		Elective-I	CV	3	2	0	5	4	40	60	40	60	0	0	200	
		Elective-II	CV	3	2	0	5	4	40	60	40	60	0	0	200	
		Project/Industrial Exposure-I	CV	15			15	15	0	0	100	0	0	0	100	
						Total	**25**	**23**							**500**	

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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	
6		Elective-I	CV	3	0	0	3	3	40	60	0	0	0	0	100
		Elective-II	CV	3	2	0	5	4	40	60	40	60	0	0	200
		Project/Industrial Exposure-II	CV	15			15	15	0	0	100	0	0	0	100
						Total	**23**	**22**							**400**

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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**	
7		Elective-I	CV	3	0	0	3	3	40	60	0	0	0	0	100
		Project/Industrial Exposure-III	CV	20			20	20	0	0	150	200	0	0	350
						Total	**23**	**23**							**450**
8		Project/Industrial Exposure-IV	CV	23			**23**	**23**	0	0	200	300	0	0	500
						Total	**23**	**23**							**500**
						Total	**193**	**180**							**5800**