SCHOOL OF ENGINEERING

B. TECH. (MECHANICAL ENGINEERING)

SYLLABUS BOOK

AY 2023-24

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 EUCATIONAL OBJECTIVES
PEO 1	Solve real-world engineering problems, design and develop innovative and cost-effective solutions exhibiting engineering skills/fundamentals to cater needs of society.
PEO 2	Excel in Industry/technical profession, higher studies, and entrepreneurship exhibiting comprehensive competitiveness.
PEO 3	Exhibit professional ethics & values, effective communication, teamwork, multidisciplinary approach, and ability to relate engineering issues to broader societal framework.

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

PSO No	PROGRAMME SPECIFIC OUTCOMES (PSO) MECHANICAL ENGINEERING
PSO 1	Analyse, interpret and provide solutions to real life Mechanical Engineering problems.
PSO 2	Develop an attitude to accept global challenges and apply Mechanical Engineering knowledge for solving problems related to design, production, thermal and interdisciplinary fields.
PSO 3	Attain excellence in using managerial tools and techniques for effective and efficient manufacturing and in developing research & leadership skills with ethical and environmental practices.

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.
(Mechanical Engineering)

P P Savani University

School of Engineering

Effective From: 2023-24
Authored by: P P Savani University

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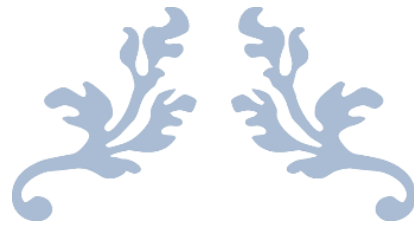
FIRST YEAR B. TECH.

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR FIRST YEAR B.TECH. PROGRAMME AY: 2023-24

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						Total
				Contact Hours				Credit	Theory		Practical		Tutorial		
				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
	SESH1120	Linear Algebra	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SEME1110	Hardware Workshop	ME	0	4	0	4	4	0	0	100	0	0	0	100
	SECE1110	Software Workshop	CE	0	4	0	4	2	0	0	100	0	0	0	100
	SEIT1110	Cyberspace Awareness	IT	2	0	0	2	2	40	60	0	0	0	0	100
	SEIT1120	Competitive Quantitative Aptitude	IT	2	0	0	2	2	40	60	0	0	0	0	100
	SECE1120	Joy of Programming	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SESH1130	Conceptual Experimental Physics	SH	3	2	0	5	4	40	60	40	60	0	0	200
	SECH1110	Fundamental Chemistry & Environmental Science	CH	3	2	0	5	4	40	60	40	60	0	0	200
	SEME1120	Fundamentals of Technical Drawing	ME	0	4	0	4	4	0	0	40	60	0	0	100
	SECV1110	Core Engineering Concepts	CV	3	2	0	5	4	40	60	40	60	0	0	200
	CFLS2130	Intermediate Communicative English	CFLS	2	2	0	4	3	100	00	100	0	0	0	200
	CLSC2070	Essentials of Entrepreneurship	CFLS/SLM	2	0	0	2	2	100	0	0	0	0	0	100
						Total	52	45							2000

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR FIRST YEAR B.TECH. PROGRAMME AY: 2023-24

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						Total
				Contact Hours				Credit	Theory		Practical		Tutorial		
				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
	SEME1110	Hardware Workshop	ME	0	4	0	4	4	0	0	100	0	0	0	100
	SEIT1110	Cyberspace Awareness	IT	2	0	0	2	2	40	60	0	0	0	0	100
	SESH1130	Conceptual Experimental Physics	SH	3	2	0	5	4	40	60	40	60	0	0	200
	SEME1120	Fundamentals of Technical Drawing	ME	0	4	0	4	4	0	0	40	60	0	0	100
	SECE1120	Joy of Programming	CE	3	2	0	5	4	40	60	40	60	0	0	200
	CFLS2130	Intermediate Communicative English	CFLS	2	2	0	4	3	100	0	100	0	0	0	200
				Total			**29**	**26**							**1100**
Group 2	SESH1120	Linear Algebra	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SECE1110	Software Workshop	CE	0	4	0	4	2	0	0	100	0	0	0	100
	SEIT1120	Competitive Quantitative Aptitude	IT	2	0	0	2	2	40	60	0	0	0	0	100
	SECH1110	Fundamental Chemistry & Environmental Science	CH	3	2	0	5	4	40	60	40	60	0	0	200
	SECV1110	Core Engineering Concepts	CV	3	2	0	5	4	40	60	40	60	0	0	200
	CLSC2070	Essentials of Entrepreneurship	CFLS/ SLM	2	0	0	2	2	100	0	0	0	0	0	100
				Total			**23**	**19**							**900**

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 Science and 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

Department of Mechanical Engineering

Course Code: SEME1110
Course Name: Hardware 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	
-	04	-	04	-	-	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.

Course Content:

Sr. No.	Name of Practical	Hours
1.	Introduction and Demonstration of Safety Norms. Different Measuring Instruments. Introduction and Demonstration of Machine Shop. To Perform a Job of Fitting Shop.	12
2.	To Perform a Job of Carpentry Shop. Introduction and Demonstration of Plumbing Shop & Welding Process.	15
3.	(I)Identify computer hardware layout and components (II)Perform assembling and disassembling of PC	08
4.	Configure BIOS, disk, network and other hardware management	05
5.	Understanding the electronic components and study of Shouldering and Desoldering of electronic components on PCB Board.	04
6.	Understanding the connection on Breadboard and study of Alternate Flashing LED Lights using Breadboard.	06
7.	Verify the truth table of Logic gates and De morgan's theorem on IC trainer board.	04
8.	Study of Cathode Ray Oscilloscope.	06

Text Book(s):

Title	Author(s)	Publication
Elements of Workshop Technology	S K Hajra Choudhury	Media Promoters & Publishers
A text book in Electrical Technology	B L Theraja	S Chand and Co

Reference Book(s):

Title	Author(s)	Publication
Basic Electronics: A text lab manual	P.B. Zbar, A.P. Malvino, M.A. Miller	Mc-Graw Hill.
Digital Electronics	Subrata Ghoshal	Cengage Learning

Course Evaluation:

Practical:
- Continuous Evaluation consists of Performance of Practical/Tutorial which will be evaluated out of 10 for each practical/Tutorial 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
- Internal Viva consists of 30 Marks.
- Practical performance/quiz/drawing/test will consist of 30 Marks.

Course Outcome(s):

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

SEME1110	HARDWARE WORKSHOP
CO 1	Apply the application of mechanical workshop such as fitting, drilling and carpentry. Understand various tools of mechanical workshop and understand its applications.
CO 2	Identify and inspect hardware components and interpret latest development of the field.
CO 3	Make students capable of analysing and solving the varieties of problems coming up in the electrical measurements and also enable the students to design as well as trouble shoots the circuits and networks through hands-on mode.
CO 4	Develop skill to build, and troubleshoot digital circuits.

Mapping of CO with PO

SEME1110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	2	1		3	3		3	3	1	3
CO 2	2	1	1	1	2	2			2	2	1	2
CO 3	3	2	2	2	2	2	2	3	2	2	3	3
CO 4	2	3	2	3	3		3	3	1	2	1	2

Mapping of CO with PSO

SEME1110	PSO1	PSO2	PSO3
CO 1	3	1	1
CO 2	1	1	2
CO 3	1	3	3
CO 4	2	2	2

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 Instruments. Introduction and Demonstration of Machine Shop. To Perform a Job of Fitting Shop.	1,2,3,4
2	To Perform a Job of Carpentry Shop. Introduction and Demonstration of Plumbing Shop & Welding Process.	1,2,3,4
3	(I)Identify computer hardware layout and components (II)Perform assembling and disassembling of PC	1,2,3,4
4	Configure BIOS, disk, network and other hardware management	1,2,3
5	Understanding the electronic components and study of Shouldering and Desoldering of electronic components on PCB Board.	1,2,3
6	Understanding the connection on Breadboard and study of Alternate Flashing LED Lights using Breadboard.	1,2,3
7	Verify the truth table of Logic gates and De morgan's theorem on IC trainer board.	1,2,3,4
8	Study of Cathode Ray Oscilloscope.	1,2,3

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE1110
Course Name: Software 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	
-	04	-	02	-	-	100	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to
● Provide a comprehensive knowledge of overall basic computer software tools and technology.
● Providing hands-on experience related to basic software installation, usage of Operating systems, and various essential software utilities.

Course Content:

Section I		
Module No.	Content	Weightage in %
1.	**Software Fundamentals** Introduction to Software, Types of software, Applications of software, Web based software, Understand Software specific requirements, Installation of Software	10
2.	**Operating System** Introduction of OS, Functions of Operating System, Types of OS, Installation of Windows and Linux OS, Linux architecture, Role of Device Drivers in OS, Shell scripting, Command structure, and general-purpose utility.	25
3.	**DOS Commands** Getting Started with DOS, Introduction to Command Prompt, System Files and Command, creating directories, traversing through directories, deleting directories, Viewing Files within a directory.	15
Section II		
Module No.	Content	Weightage in %
1.	**Application Software** Introduction to Application Software, Types of Application Software, Installation of Application Software, Logo Designing, Creating Flowcharts and diagrams, Introduction to Google Apps.	10

Sr. No.		Hours
2.	**Data Analysis using Application Software** Introduction to Spreadsheets, Spreadsheet Functions to Organize Data, Introduction to Filtering, Pivot Tables, and Charts, VlookUp and HlookUp in Spreadsheets.	15
3.	**Website Creation** Creating a website using Google Sites, Creating Web Pages, Working with Images, Working with Documents on Web Pages. Introduction to WordPress, Installing Web Server and WordPress, Creating Web pages in WordPress.	25
	TOTAL	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Study of Different Software.	02
2.	Installation of any 2 software with required plugins and libraries.	04
3.	Study of Different Operating Systems.	02
4.	Creation of Bootable Pen drive.	02
5.	Installation of Windows OS.	02
6.	Installation of Linux OS using VMWare.	02
7.	Study of Basic commands of Linux/UNIX.	04
8.	Study of Basic commands of DOS.	04
9.	Design logo using Canva.	02
10.	Draw a Flowchart to find maximum of two numbers in either draw.io or Microsoft Visio or Lucid Chart.	02
11.	Study of different Google Apps.	04
12.	Create a Google Doc and Google sheet and share with 2 classmates.	02
13.	Demonstrate working of HlookUp and VlookUp in Excel.	02
14.	Create different types of charts in Excel.	04
15.	Demonstrate Data Analysis in Excel.	04
16.	Create a Google Website with minimum two pages showing your personal details.	04
17.	Demonstrate embedding of a YouTube video and pdf document on a web page in google site.	04
18.	Demonstrate placing Map and hyperlinks on web page in Google Site.	04
19.	Create a WordPress site and create minimum three web pages and menu to navigate between the pages.	04
20.	Demonstrate the use of Accordion in WordPress.	02
	TOTAL	60

Text Book(s):

Title	Author/s	Publication
Fundamentals Of Computers, 2nd Edition	Reema Thareja	Oxford University Press
Excel 2019 Bible	Michael Alexander, Richard Kusleika, John Walkenbach	Wiley

Reference Book(s):

Title	Author/s	Publication
UNIX: Concepts and Applications	4th Edition	Sumitabha Das	McGraw Hill Education

Web Material Link(s):
- https://sites.google.com/site/willkimbley/google-apps-tutorials
- https://www.cs.upc.edu/~robert/teaching/foninf/doshelp.html
- https://www.javatpoint.com/software-engineering
- https://www.wikihow.com/Create-a-Website-Using-Google-Sites
- https://www.wpbeginner.com/guides/

Course Evaluation:
Practical:
- Continuous Evaluation consists of performance of practical, which should be evaluated out of 10 marks per each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during Internal practical Exam.
- Mini Project performance consists of 40 marks during End Semester Exam.

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

SECE1110	Software Workshop
CO 1	Understand the types of computer software with their requirements and how to use as per the need.
CO 2	Install different Operating Systems and learn commands used in the OS.
CO 3	Get familiar with the application software and different applications of application software
CO4	Achieve some useful information from data through analysis and represent it with different views like charts, graphs etc.
CO 5	Learn the designing and development of website to have a global communication.

Mapping of CO with PO

SECE1110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	2	2	3		1		1	2	2	1
CO 2	3	1	1	1	1		1			1		1
CO 3		1	2	2	3	2	1		2	1	2	3
CO 4	2	1		2	1		1		1	1		
CO 5	1	1	1	2	1	3	1		1	1	2	1

Mapping of CO with PSO

SECE1110	PSO1	PSO2	PSO3
CO 1	1	3	1
CO 2		3	1
CO 3	2		2
CO 4	2		1
CO 5		1	

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

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

Module No	Content	RBT Level
1	Software Fundamentals	1,2
2	Operating System	1,2,3,6
3	Disk Operating System	2,3
4	Application Software	2,3,4,5
5	Data Analysis using Application Software	3,4,5,6
6	Website Creation	2,3,6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT1110
Course Name: Cyberspace Awareness
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to,

- understand governance, regulatory, legal, economic, environmental, social, and ethical context of cyber security.
- equip students with the technical knowledge and skills needed to protect and defined against cyber threats.
- help students to protect the one's data, systems, and networks from malicious attacks and cyber threats.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Cyber space** Cyber space, Cyber Crime and its Types, Overview of Cyber Security, Cyber Attacks in History, Internet Governance, Hacking and its Types, Cracking, Overview of System and Web Vulnerability, OWASP	06	20
2.	**Cyber Threats** Various Cyber Threats, Malware, Phishing, Password Attacks, DOS attack, Man in the Middle, Drive by download, Malvertising, Rogue Software, Cyber Warfare and its conflicts, Cyber Terrorism, Case studies	09	30
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Cyber security Practices** Cyber Security Practices and dos and don'ts, Data Privacy and Security, Security Controls, Overview of social media and its security, E-Commerce, Digital payments and its security, Tools and technology	05	15

		for cyber security, Platform to report and combat cyber-crime, Case studies		
2.	**Cyberspace and the Law** Cyber Security Regulations, Cyber Law, need for a Comprehensive Cyber Security Policy, Need for an International convention on Cyber space, Contemporary crime, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards, The INDIAN Cyberspace, Indian IT Act 2000, Indian IT Act 2008, Case studies	06	15
3.	**Cyber Forensics** Introduction to Cyber Forensics, Handling Preliminary analysis, Investigating Investigations, Controlling an Investigation, Legal Policies, Case studies	04	20
	TOTAL	30	100

Text Book(s):

Title	Author/s	Publication
Cybersecurity for Beginners	Raef Meeuwisse	Cyber Simplicity Ltd

Reference Book(s):

Title	Author/s	Publication
Cyber Security	Nina Godbole, Sunit Belapure	Wiley India, New Delhi
The Indian Cyber Law	Suresh T. Vishwanathan;	Bharat Law House New Delhi

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,

SEIT1110	Cyberspace Awareness
CO 1	Understand Concepts of Cyber space.
CO 2	Analyze the Concepts of Cyber Threats.
CO 3	Elaborate the overview of social media and understanding cybercrimes.
CO 4	Identify cyber laws and cyber acts in India.
CO 5	Explore different case studies based on cyber-Forensics.

Mapping of CO with PO

SEIT1110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3		3	3	3					

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

Mapping of CO with PSO

SEIT1110	PSO1	PSO2	PSO3
CO 1	3	3	
CO 2		3	3
CO 3	3	3	
CO 4			3
CO 5		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 Cyber space	1
2	Cyber Threats	1,2
3	Cyber security Practices	1,2,3
4	Cyberspace and the Law	1,2
5	Cyber Forensics	1,23

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SEIT1120
Course Name: Competitive Quantitative Aptitude
Prerequisite Course(s): ---

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
● This course is designed to suit the need of the outgoing students and to acquaint them with frequently asked patterns in quantitative aptitude and logical reasoning during various examinations and campus interviews.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Quantitative Ability (Basic Mathematics)** Number Systems, LCM and HCF, Decimal Fractions, Simplification, Square Roots and Cube Roots, Average, Problems on Ages, Surds & Indices, Percentages, Problems on Numbers, Quadratic Equations	05	15
2.	**Quantitative Ability (Applied & Engineering Mathematics)- Part I** Logarithm, Permutation and Combinations, Probability, Profit and Loss, Simple and Compound Interest,	05	35
3.	**Quantitative Ability (Applied & Engineering Mathematics) -Part II** Time, Speed and Distance, Time & Work, Ratio and Proportion, Mixtures and Allegation	05	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Data Interpretation** Data Interpretation, Tables, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Venn Diagrams1	06	20

2.	**Logical Reasoning (Deductive Reasoning)** Analogy, Blood Relation, Directional Sense, Number and Letter Series, Coding – Decoding, Calendars, Clocks, Seating Arrangement, Syllogism	06	20
3.	**Mensuration & Trigonometry** Two-dimensional (2D) and Three-dimensional (3D) Mensuration, Degree and Radian Measures, Trigonometric Ratios, Complementary Angles, Height and Distance, Standard Identities, Area, Inequalities	03	10
		30	

Text Book(s):

Title	Author/s	Publication
Quantitative aptitude for Competitive examination	R S Agarwal	S. Chand
A Modern Approach to Verbal & Non-Verbal Reasoning	R S Agarwal	S. Chand

Reference Book(s):

Title	Author/s	Publication
Analytical and Logical reasoning	Sijwali B S	arihant

Web Material Link(s):
- https://prepinsta.com/
- https://www.indiabix.com/
- https://www.javatpoint.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.

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

SEIT1120	Competitive Quantitative Aptitude
CO 1	Understand the basic concepts of quantitative ability
CO 2	Understand the basic concepts of logical reasoning Skills
CO 3	Acquire satisfactory competency in use of reasoning
CO4	Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning Ability
CO 5	Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc

Mapping of CO with PO

SEIT1120	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2	2	2	2	3		1	3	2	3
CO 2	2	2	3	2	3	2	3		3	3	2	2
CO 3	2	2	2	2	3	2	3		3	1	2	3
CO 4	3	2	3	3	3	2	2		3	3	2	3
CO 5	2	2	2	2	1	3	3		3	2	1	3

Mapping of CO with PSO

SEIT1120	PSO1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	3	2
CO 3	3	3	3
CO 4	3	2	3
CO 5	2	1	2

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

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

Module No	Content	RBT Level
1	Quantitative Ability (Basic Mathematics)	1, 3, 5
2	Quantitative Ability (Applied & Engineering Mathematics)	1, 2, 3, 5
3	Data Interpretation	2, 3, 6
4	Logical Reasoning (Deductive Reasoning)	2, 4, 5
5	Mensuration & Trigonometry	1, 3, 5

P P Savani University
School of Engineering
Department of Computer Engineering

Course Code: SECE1120
Course Name: Joy of Programming
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
- identify appropriate approach to computational problems.
- develop logic building and problem-solving skills.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Motivation of Programming:** Use of Programming, Importance of Programming, Discussion of different Case Study	05	14
2.	**Welcome to Programming:** Introduction of Programming, Flow Charts and Algorithms, Debugging, Tracing the execution of the Program, Watching Variables Values in Memory, Character Set, Keyword and Identifiers, Constants and Variables, Data Types - Declaration and Initialization, Basic Input, and Output Operations, Symbolic Constants, Overflow and Underflow of Data.	09	18
3.	**Conditional Statements and Looping Statements:** Decision Making & Branching: Decision Making with If and If - else Statements, Nesting of If-else Statements, The Switch and go-to statements. Looping: The while Statement, The Break Statement &The Do While loop, The FOR loop, Jump within loops - Programs.	09	18
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Collection of Data:** Introduction, One-dimensional Arrays, Two-dimensional Arrays, Concept of Multidimensional Arrays, Declaring and	10	20

	Initializing String Variables, Arithmetic Operations on Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions, Dictionary, List, Tuples and Sets.			
2.	**Functions** Introduction to Functions, defining a Function, Calling a Function, Types of Functions, Function Arguments, Anonymous Functions, Global and Local Variables, Recursion	06	15	
3.	**Building Desktop Application** Exploring the Tkinter Library in Python, Creating basic Desktop application using Tkinter	06	15	
	TOTAL	45	100	

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Working with basic elements of C languages (different input functions, different output functions, different data types, and different operators).	2
2.	Working with control structures (if statement, if-else statement, nested if-else statement, switch statement, break statement, goto statement).	2
3.	Working with array and strings in C.	4
4.	Introduction to Python (Introduction to IDLE, different data types, Input Output in Python, Operators, Operator precedence).	2
5.	Implementation of Dictionaries, Sets, Tuples and Lists and its various methods in Python.	6
6.	Working with functions in C/Python.	2
7.	Working with recursive function in C/Python.	2
8.	Building desktop application of your own calculator in Python.	4

9.	Case Study:
	    a. Sorting : Arrange the books
	    b. Searching : Find in seconds
	    c. Recursion : Tower of Hanoi
		6

	TOTAL	30

 # Use of different libraries will be covered in Practical Assignments.

Text Book(s):

Title	Author(s)	Publication
Programming in ANSI C	E. Balagurusamy	Tata McGraw Hill
Python Programming: A modular approach	Sheetal Taneja, Naveen Kumar	Pearson

Reference Book(s):

Title	Author(s)	Publication
Programming in C	Ashok Kamthane	Pearson
Python Cookbook	David Ascher, Alex Martelli Oreilly	O Reilly Media

Web Material Link(s):

- https://www.tutorialspoint.com/cprogramming/index.htm
- https://www.w3schools.com/c/
- https://www.tutorialspoint.com/python/
- https://www.w3schools.com/python/

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 the performance of practical which will 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/oral performance consists of 30 marks during End Semester Exam.

Course Outcomes:

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

SECE1120	JOY OF PROGRAMMING
CO 1	Immediately analyze the syntax and semantics of the computer languages and apply it in programs.
CO 2	Implement computing solutions using logic building and problem-solving skills of a given programming language.
CO 3	Interpret the fundamental language syntax, semantics and fluent in the use of python or any computer language control flow statements.
CO 4	Determine the methods to create and manipulate programs by utilizing the data structures like lists, dictionaries, tuples and sets with emphasis on Python.

Mapping of CO with PO

SECE1120	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		2	1	1	2	2	1	1			1	
CO 2	2	1	2							2		1
CO 3	2	1		2								1
CO 4		1	1		1				1			

Mapping of CO with PSO

SECE1120	PSO1	PSO2	PSO3
CO 1	1		1
CO 2		2	
CO 3		1	1

			2
CO 4			

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.	Motivation of Programming	1, 2, 4
2.	Welcome to Programming	1, 2, 3
3.	Conditional Statements and Looping Statements	1, 2, 3
4.	Collection of Data	1, 2, 3
5.	Functions	2, 3, 4, 6
6.	Building Desktop Application	2, 3, 4, 6

P P Savani University
School of Engineering
Department of Chemical Engineering

Course Code: SESH1130
Course Name: Conceptual 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	-	04	40	60	40	60	-	-	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	07	16

Module	Content	Hours	Weightage in %
	effect, Applications of Ultrasonic.		
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. FIBRE OPTICS – Introduction, Optical Fiber construction, working principle and types, Numerical Aperture, Acceptance angle and Attenuation, Fiber optic communication system, Applications of Optical Fiber.	08	18

Section II			
Module	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

		TOTAL	45	100

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 hencefind 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
	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

Reference Book(s):

Title	Author/s	Publication
Engineering Physics	G Vijayakumari	Vikas Publishing house PVT LTD
Basic Electronics for Scientistsand 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, 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,
- Internal viva or practical performance consist of 20 Marks. Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- 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 student will be able to

SESH1130	Conceptual Experimental Physics
CO 1	Understand the framework of quantum mechanics and apply the knowledge ofbasic 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 possiblesector.
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 toanalyze 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	PO12
CO 1	2	2	2	2						1		
CO 2	1	3	2	3	1		1			1	2	
CO 3	1	1	1	1	1						1	
CO 4	2	2	1	2	1							
CO 5	1	1	1	1	1					1	2	

Mapping of CO with PSO

SESH1130	PSO1	PSO2	PSO3
CO 1	2	2	
CO 2		1	1
CO 3		2	2
CO 4	2	1	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	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 Chemical Engineering

Course Code: SECH1110
Course Name: Fundamental Chemistry & Environmental Science
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 concepts of chemistry, including atoms, molecules, and chemical processes.
- Apply the scientific method to examine chemical phenomena, including the design and execution of experiments, data analysis, and evidence-based conclusion drawing.
- Evaluate the causes and consequences of environmental problems and propose solutions based on scientific evidence.
- Integrate knowledge from multiple disciplines to analyze environmental problems and propose effective solutions.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Chemistry** Overview of the scientific method and chemistry as a science, Basic concepts of matter, including atoms, molecules, and the periodic table, Introduction to chemical bonding and intermolecular forces, Basic principles of chemical reactions, including stoichiometry and reaction types	06	15
2.	**Chemical Thermodynamics and Kinetics** Introduction to thermodynamics and the laws of thermodynamics, Energy and enthalpy changes in chemical reactions, Introduction to chemical kinetics and reaction rates, Factors affecting reaction rates, including temperature, concentration, and catalysts	06	15
3.	**Properties of Matter and Solutions** Physical properties of matter, including states of matter and phase changes, Solutions and their properties, including solubility and colligative properties, Introduction to acids and bases and their properties, Chemical equilibrium and the equilibrium constant	05	10

Module No.	Content	Hours	Weightage in %
4.	**Organic Chemistry** Introduction to organic chemistry and the basics of carbon chemistry, Functional groups and their properties, Nomenclature and isomerism in organic compounds, Introduction to organic reactions and mechanisms	06	10

	Section II		
Module No.	Content	Hours	Weightage in %
5.	**Introduction to Environment** Definition, principles and scope of Environmental Science, Impacts of development on Environment, Environmental Degradation, The interdisciplinary nature of environmental science, Concept of 4R's	06	10
6.	**Environmental Pollution** a) Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution, Classification of water pollutants, Effects of water pollutants. b) Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO_2, NO_X, Auto exhaust, Effects of common air pollutants c) Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects. d) Solid Waste: Generation and management e) Bio-medical Waste: Generation and management f) E-waste: Generation and management	08	20
7.	**Social Issues and Environment** Sustainable Development, Equitable use of Resources for sustainable lifestyle and it's benefits, Water conservation, Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer, Carbon Footprint	08	20
	TOTAL	45	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Acid-base titration adding a base of known concentration to an acid of unknown concentration until the reaction is complete, and the concentration of the acid is determined.	02
2.	Determination of the boiling point of a liquid heating a sample of a liquid and observing the temperature at which it boils.	02
3.	Determination of the density of a liquid weighing a known volume of a liquid and calculating its density.	04
4.	Determination of the pH of a solution using a pH meter to measure the acidity or basicity of a solution.	04
5.	Flame test: burning a sample of a substance and observing the color of the flame to identify the presence of certain elements.	04
6.	Preparation of a salt reacting an acid and a base to form a salt and observing the	02

	reaction products.	
7.	Testing of soil acidity	02
8.	Studying the effect of temperature on the solubility of a solid in water at different temperatures to see how temperature affects solubility.	02
9.	Studying the properties of acids and bases: Students can test the properties of different acids and bases (e.g., pH, conductivity) and compare their properties.	04
10.	Investigating the reaction between an acid and a metal and measure the amount of gas produced.	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Textbook of Environmental Chemistry and Pollution Control	Dr. S. S. Dara, Dr. D.D. Mishra	S Chand & Co Ltd
Environmental Studies	Benny Joseph	Mc.Graw hill education Pvt. Ltd.
Environmental Studies	Dr. S.K. Dhameja	S.K. Kataria & Sons

Reference Book(s):

Title	Author/s	Publication
Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing company
Environmental Studies (From crisis to cure)	R. Rajagopalan	OXFORD university press

Web Material Link(s):
https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_ENS_LECTURE_NOTES_2.pdf

Course Evaluation:
Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:
- Continuous Evaluation consists of performance of Practical which will be evaluated out of 10 marks 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 presentation consists of 30 marks during End Semester Exam.

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

SECH1110	Fundamental Chemistry & Environmental Science
CO 1	Develop a fundamental understanding of the principles and concepts of chemistry,

		including atomic structure, chemical reactions, and chemical bonding.
CO 2		Demonstrate an ability to apply chemical knowledge to real-world problems, such as calculating reaction yields and predicting chemical properties.
CO 3		Identify the types of pollution in society along with their sources.
CO 4		Realize the global environmental issues.

Mapping of CO with PO

SECH1110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO011	PO012
CO 1	2					2			2		1	2
CO 2	1	1	1			3		3	3		1	3
CO 3	2		1	2		2	2		1	3	1	3
CO 4	2								3		2	3

Mapping of CO with PSO

SECH1110	PSO1	PSO2	PSO3
CO 1	1	3	2
CO 2			
CO 3	3	3	2
CO 4	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 Chemistry	2,1
2	Chemical Thermodynamics and Kinetics	4, 5
3	Properties of Matter and Solutions	1,2
4	Organic Chemistry	4,5
5	Introduction to Environment	1,2
6	Environmental Pollution	1,2,3
7	Social Issues and Environment	1,2,3

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME1120
Course Name: Fundamentals of Technical Drawing
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	-	04	-	-	40	60	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to
● Know conventions and the methods of engineering drawing.
● Interpret engineering drawings using fundamental technical mathematics.
● Construct basic and intermediate geometry.
● Improve their visualization skills so that they can apply these skills in developing new products.
● Improve their technical communication skill in the form of communicative drawings.
● Comprehend the theory of projection.
● Basic knowledge of computer-aided drawing using AutoCAD.

Course Content:

Section I			
Module No.	Contents	Lab Hours	Weightage in %
1.	**Introduction:** Importance of the Course; Use of Drawing Instruments and accessories; BIS – SP – 46; Lettering, Dimensioning, and Lines; Representative Fraction; Types of Scales (Plain and Diagonal Scales); Construction of Polygons.	03	05
2.	**Engineering Curves:** Classification and Application of Engineering Curves; Construction of Conics, Cycloidal Curves, Involutes, Spiral, and Normal & Tangent to each curve.	12	15
3.	**Projections of points, lines & planes:** Types of Projections; Introduction of Principle Planes of Projections; Projection of Points in all four Quadrants; Projection of Lines inclined to one Referral Plane & two Referral Planes. True length and inclination with reference plane; Projection of Planes (Circular and Polygonal) with inclination to one Referral Plane and	15	30

	two Referral Planes; Concept of Auxiliary Projection Method.		

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Orthographic Projection and Isometric Projections** Types of Projections: Principle of First and Third Angle Projection Applications & Difference; Projection from Pictorial view of Object, View from Front, Top, and Sides; Full Section View. Isometric Scale, Conversion of Orthographic views into Isometric Projection, Isometric View, or Drawing of simple objects.	18	30
2.	**Residential Building Planning:** Introduction to buildings, Classification of buildings, Principles of building planning, Principles of architecture composition, Detail drawing, Line Plan, plan, elevation, section, Preparing working drawing of residential building.	06	10
3.	**Computer-Aided Drawing:** Introduction to AutoCAD, Basic commands for 2D drawing (Line, Circle, Polyline, Rectangle, Hatch, Fillet, Chamfer, Trim, Extend, Offset, Dim style, etc.)	06	10
	TOTAL	60	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction sheet (dimensioning methods, different types of lines,construction of various polygons, dividing the line and angle into parts, use of stencil, lettering), plane scale and diagonal scale	03
2.	Engineering curves	12
3.	Projection of points, lines & planes	15
4.	Orthographic projection	10
5.	Isometric projection	10
6.	Residential building drawing (Line plan, Plan, Elevation, Section, Schedule opening)	04
7.	Computer-Aided Drawing	06
	TOTAL	60

Text Book(s):

Title	Author(s)	Publication
A Text Book of Engineering Graphics	P J Shah	S. Chand & Company Ltd., New Delhi
Engineering Drawing	N D Bhatt	Charotar Publishing House, Anand
Building Planning, Designing and Scheduling	Gurucharan Singh	Standard Book

Reference Book(s):

Title	Author(s)	Publication

Engineering Drawing	P.S.Gill	S. K. Kataria & sons, Delhi
Engineering Drawing	B. Agrawal & C M Agrawal	Tata McGraw Hill, New Delhi
Engineering drawing made Easy	K. Venugopal	Wiley Eastern Ltd
Building Drawing	M. G. Shah, C.M. Kale, S.Y. Patki	Tata McGraw Hill

Web Material Link(s):

● http://nptel.ac.in/courses/105104148/

Course Evaluation:

Practical:

● Continuous evaluation consists of performance of practical/tutorial which will be evaluated out of 20 marks for each practical/tutorial and average of the same will be converted to 20 marks.
● Internal viva consists of 20 marks.
● Practical test will consist of 30 marks and viva will consist of 30 marks during end semester exam.

Course Outcome(s):

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

SEME1120	FUNDAMENTALS OF TECHNICAL DRAWING
CO 1	Apply BIS standards of building planning and conventions while drawing Lines, printing Letters, and showing dimensions.
CO 2	Explore the various methods to draw various engineering curves and their applications.
CO 3	Classify the orthographic projection systems concerning the observer, object, and reference planes.
CO 4	Develop 3D Isometric views in relation to 2D orthographic views.
CO 5	Software application in engineering drawing.

Mapping of CO with PO

SEME1120	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	1	1				1			1	
CO 2	2		1	1	1			1			1	
CO 3	2		1	1				1			1	1
CO 4	2		1	2	1			1			1	1
CO 5	2	1	1	2	1			1			1	1

Mapping of CO with PSO

SEME1120	PSO1	PSO2	PSO3
CO 1	1	2	2
CO 2	2	2	3
CO 3	2	3	1
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

Module No	Content	RBT Level
1	Introduction	1, 2, 6
2	Engineering Curves	2, 6
3	Projection of Points, Line & Plane	1, 2, 3, 4
4	Orthographic Projection	2, 5, 4
5	Isometric Projections and Isometric Drawing	2, 5, 4
6	Computer-Aided Drawing	2,3,6

Department of Civil Engineering

Course Code: SECV1110
Course Name: Core Engineering Concepts.
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
● Study the basic fundamentals of construction planning and material.
● Study significance of mechanical engineering systems in different fields of engineering.
● Study the basic concepts of electrical and electronics engineering.

Course Content:

	Section I		
Module No.	Content	Hours	Weightage in %
1.	**Basics of Construction material and techniques** Common materials used in construction, Aggregate, Sand, Cement, Bricks, Timber, Steel, Paints. Bonds in brick masonry techniques, Foam works, Curing, Compaction of concrete, Water proofing, Fire safety norms and requirement.	08	18
2.	**Building planning and Bye laws** Building by laws as per national building code, building by laws as per local authority, standards for residential, public, commercial, industrial and institutional buildings planning, planning of earth quake resistance building, overview of RERA and ODPS, Green building and LEED certification, general layout, maps and plan used at construction site.	08	18
3.	**Basic Electricity Principles** Concept of Charge, Potential Difference and Current, Resistor, capacitor, Inductor, Ohm's law, effect of Temperature on resistance, temperature coefficient, Series and parallel combinations of Resistors and capacitors, Lenz and Faraday's laws for electromagnetic induction, AC Electricity and DC Electricity. **Electrical Wiring:** Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors.	07	14
	Section II		

Module No.	Content	Hours	Weightage in %
1.	**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
2.	**Power Transmission Elements:** Construction and Applications of Couplings, Clutches and Brakes, Difference Between Clutch and Coupling, Types of Belt Drive and Gear Drive	08	18
3.	**DC Circuits and AC Circuits** DC Circuits: Introduction of Electrical circuit elements (prerequisites), voltage and current sources, Kirchoff's current and voltage laws, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits. AC Circuits: Representation of sinusoidal waveforms, peak and RMS values, Phasor representation of AC quantities, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), Series and parallel resonance. Three phase balanced circuits, voltage and current relations in star and delta connections, Power measurement in three phase circuits.	06	14
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Preparation of drawing sheet showing various bonds.	04
2.	Preparation of Basic plan of Construction site.	04
3.	Preparation sketch of various building component.	04
4.	Verify the series and parallel connections of resistors and capacitors.	04
5.	To understand construction and working of various types of boilers.	04
6.	To understand construction and working of mountings and accessories.	04
7.	To verify the Kirchoff's current and voltage laws and Network theorems.	02
8.	To understand construction and working 2 –stroke & 4 –stroke Petrol engines.	02
9.	To understand construction and working 2 –stroke & 4 –stroke Diesel engines.	02
	TOTAL	30

Text Book(s):

Title	Author(s)	Publication
Elements of Mechanical Engineering	Sadhu Singh	S. Chand Publications
Building construction	Dr. B C Punamia	Laxmi Publication
A text book in Electrical Technology	B L Theraja -	S Chand & Co.
Basic Electrical Engineering	D. C. Kulshreshtha	McGraw Hill, 2009

Reference Book(s):

Title	Author(s)	Publication
Basic Mechanical Engineering	T.S. Rajan	Wiley Eastern Ltd., 1996.

Town Planning	G. K. Hiraskar	Dhanpatrai Publications
Basic Electrical Engineering	Nagsarkar and Sukhija,	Oxford 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 of practical which will be evaluated out of 20marks for each practical and average of the same will be converted to 10 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 the completion of the course, the following course outcomes will be able to:

SECV1110	CORE ENGINEERING CONCEPTS
CO 1	Understand basic properties of various construction materials.
CO 2	Understand the general rules and regulation of building planning.
CO3	Apply the principles of basic mechanical engineering.
C04	Comprehend the importance of mechanical engineering equipment like IC engine and power transmission elements.
CO5	Understand working of various instruments and equipments used for the measurement of various electrical engineering parameters like voltage, current, power, phase etc in industry as well as in power generation, transmission and distribution sectors.

Mapping of CO with PO

SECV1110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	1	1			2		1	1	2	1
CO 2	2		1	1	2		2		1	2	3	
CO 3	1		2	1	1	2	1		1	2	3	
CO 4	2		1	1						1		1
CO 5			1	2	1		1			1		

Mapping of CO with PSO

SECV1110	PSO1	PSO2	PSO3
CO 1	3		2
CO 2	3	1	1
CO 3	1	1	
CO 4		1	1
CO 5			1

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

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

Module No	Content	RBT Level
1	Basics of Construction material and techniques	1, 2, 3
2	Building planning and Bye laws	1, 2
3	Basic Electricity Principles	1,2,3
4	Power Transmission Elements	1, 2
5	Basics of I.C Engines	2
6	DC Circuits and AC Circuits	2,3,4
7	Basics of Steam Generators	1, 2

Centre for Language studies

Course Code: CFLS2130

Course Name: Intermediate Communicative English

Prerequisite Course/s: N/A

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)				
Theory	Practical	Tutorial	Credit	Theory	Practical	Tutorial		Total
				CE	CE	CE	ESE	
2	0	0	2	100	0	0	0	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective (s) of the course:

To help learners to

- Describe the idea of LSRW English communication abilities, for dealing with people in typical social and/or professional circumstances.
- Infer and react to instructions, paragraphs, articles, official and informal communication, and reading and listening.
- Select and demonstrate the appropriate language, grammar, and pronunciation for typical social or professional contexts.
- Analyse and present instances of effective business-related spoken English.
- Organise your thoughts to create a paragraph that flows smoothly and develop a speech script.
- Make an effort to communicate, take part in a discussion in a small group, and write.

Course Content:

S.No.	Content	Hours	Weightage in %
	Section 1		
1.	**Listening** Listening to the recording on various topics and responding. The topics may be: Personal information, Travel Information, Listening to radio interviews and summarizing. Students will be expected to demonstrate a level of listening competence as outlined in listening outcomes.	15	25
	Section 2		
2.	**Reading and Language** Reading various online articles, short stories to develop content to present and discuss. Using collocations, Using a Dictionary. Guessing the context and summarising. Students will be expected to demonstrate a level of reading competence as outlined in reading outcomes.	15	25

Section 3			
3.	**Speaking Skills, Non-Verbal Aspects** Role-plays, Real-life speaking, Presentation by a Company Director, Listening to statistical information, Interview techniques. Students will be expected to demonstrate a level of speaking competence as outlined in learning outcomes.	15	25
Section 4			
4.	**Writing** Noting and changing appointments. Writing e-mails, Applying for a Job, Writing a Business Report, Summarising, Linking ideas and arguments. Students will be expected to demonstrate a level of Speaking competence as outlined in writing outcomes.	15	25

Text Book:

Title	Author(s)	Publication
Business Benchmark Pre-Intermediate to Intermediate	Norman Whitby	Cambridge

Reference Book:

Title	Author(s)	Publication
Business Benchmark Pre-Intermediate to Intermediate Student's Book	Norman Whitby	Cambridge
Business Benchmark Pre-Intermediate to Intermediate Teacher's Book	Norman Whitby	Cambridge

Online References:

https://www.academia.edu/34869668/Business Benchmark_Pre_ Intermediate- To_Intermediate _Workbook_With_ Key

Course Evaluation:

Theory:
● Continuous Evaluation consists of four tests (LSRW), each of 25 marks and 1 hour of duration.

Course Outcome(s):

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

CFLS2130	**Intermediate Communicative English**
CO 1	Recognise the importance of the LSRW method for learning English.
CO 2	Read, hear, and decipher communications, letters, etc., and then react properly.
CO 3	Create a basic vocabulary and utilise his/her language abilities to find the information you need from a variety of sources.
CO 4	Identify various social and professional contexts
CO 5	Write and speak at a basic understanding level.

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	Listening	1, 2, 3, 4, 5, 6
2	Reading and Language	1, 2, 3, 4, 5, 6
3	Speaking Skills, Non-Verbal Aspects	1, 2, 3, 4, 5, 6
4	Writing	1, 2, 3, 4, 5, 6

P P Savani University
school of Engineering
Centre for Life Skills Courses (CLSC)

Course Code: CLSC2070
Course Name: Essentials of Entrepreneurship
Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	2	100	00	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- To understand the basics of entrepreneurship and its traits

- To analyze the theory and models of entrepreneurships

- To evaluate different types and dimensions of entrepreneurship

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Entrepreneurship** Definition of Entrepreneurship, Entrepreneurship as a career choice, Benefits and Myths of Entrepreneurship, Characteristics, Qualities and Skills of an Entrepreneur, Model Traits of Entrepreneurs	07	30
2.	**Dimensions of Entrepreneurship** Entrepreneurship Theories, Intrapreneurship, Benefits of intrapreneurship, Difference between Entrepreneurs and Intrapreneurs Institutes for Entrepreneurship Development, startup Failures, Startup Success Stories	08	20
Module No.	Content	Hours	Weightage in %
1.	**Women Entrepreneurship** Women Entrepreneurship Meaning, Factors that influence women Entrepreneurship, Barriers to Women Entrepreneurship, Qualities of Women Entrepreneurs, Success stories of Women Entrepreneurs Lijjat Papad Case study, Jassuben Pizza Case study	08	30
2.	**Social Entrepreneurship and emerging trends** Social Entrepreneurship, Functions of Social Entrepreneurship, Difference between Entrepreneurship and Social Entrepreneurship How does an NGO run?, Case Study on Social Entrepreneurship, Emerging trends in Entrepreneurship	07	20

Text Book(s):

Title	Author/s	Publication
Entrepreneurship Business and Management	Dr. R C Bhatia	Sultan Chand and Sons

Reference Book(s):

Title	Author/s	Publication
Entrepreneurship	Trehan A	Dremtech

Web Material Link(s):

- https://www.startupindia.gov.in
- https://ediindia.ac.in
- https://www.ediindia.org

Theory:

- Continuous Evaluation consists of one test of 20 marks, 10 marks assignment, 10 marks presentation, 10 marks class participation and behavior.
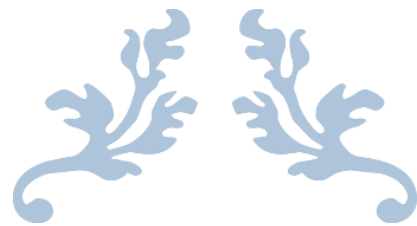- One live project of 50 marks

Course Outcome(s):

CLSC2070	Essentials of Entrepreneurship
CO 1	Students will be able to think of startup ideas
CO 2	Students will be able to apply the model of entrepreneurship practically
CO 3	Students will be able to further analyze other dimensions of Entrepreneurship

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 Entrepreneurship	1, 2, 3, 4, 5
2	Dimensions of Entrepreneurship	1, 2, 3, 4, 5
3	Women Entrepreneurship	1, 2, 3, 4, 6
4	Emerging Trends and Social Entrepreneurship	1, 2, 3, 4, 6

SECOND YEAR B. TECH.

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						Total
				Contact Hours				Credit	Theory		Practical		Tutorial		
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
3	SESH2110	Differential Methods & Complex Variable	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SEME2210	Engineering Thermodynamics	ME	3	0	0	3	3	40	60	0	0	0	0	100
	SEME2220	Material Science & Metallurgy	ME	3	2	0	5	4	40	60	40	60	0	0	200
	SEME2231	Manufacturing Technology-I	ME	3	2	0	5	4	40	60	40	60	0	0	200
	SECV2210	Mechanics of Solids	CV	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	27	24						1100
4	SESH2120	Numerical Methods & Statistics	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SEME2241	Machine Drawing	ME	0	4	0	4	2	0	0	100	0	0	0	100
	SEME2250	Fluid Mechanics	ME	3	2	0	5	4	40	60	40	60	0	0	200
	SEME2260	Mechanical Measurement & Metrology	ME	3	2	0	5	4	40	60	40	60	0	0	200
	SEME2270	Theory of Machines	ME	3	2	0	5	4	40	60	40	60	0	0	200
	CLSC2030	IPDC-II	CLSC	2	0	0	2	2	100	0	0	0	0	0	100
							Total	26	21						1000

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH2110
Course Name: Differential Methods & Complex Variable
Prerequisite Course(s): SESH1110- Calculus

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 learner to
- learn orientation of calculus and its applications in solving engineering problems including differential equations.
- learn introduction of Partial Differential Equations with methods of its solutions.
- learn applications of Laplace Transforms for solving ODEs.
- learn introduction of Periodic functions and Fourier series with their applications for solving ODEs.
- Represent complex numbers algebraically and geometrically.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Ordinary Differential Equation First order ODEs, Formation of differential equations, Exact, linear and Bernoulli's equations, Ordinary differential equations of higher orders, Homogeneous Linear ODEs of Higher Order, Homogeneous Linear ODEs with Constant Coefficients, Euler–Cauchy Equations Differential Operators Nonhomogeneous ODEs, Variation of Parameters.	10	20
2.	Partial Differential Equation Formation of First and Second order equations, Solution of First order Linear and Non-liner equations, Higher order equations with constant coefficients, Complementary function, Particular Integrals, Initial and boundary conditions, Modeling and solution of the Heat, Wave and Laplace equations.	08	17
3.	Laplace Transform Laplace Transform, Linearity, First Shifting Theorem, Existence Theorem, Transforms of Derivatives and Integrals, Unit Step Function,	07	13

Module No.	Content	Hours	Weightage in %
	Second Shifting Theorem, Laplace Transformation of Periodic function, Inverse Laplace transform, Convolution, Systems of ODEs		

<table>
<tr><td colspan="4" align="center">Section II</td></tr>
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Module No.	Content	Hours	Weightage in %
4.	Fourier Series Fourier Series of $2n$ periodic functions, Euler Formula, Arbitrary Period, Even and Odd function, Half-Range Expansions.	07	14
5.	Complex Variables Complex Variable – Differentiation, Complex number, polar form of complex number, Cauchy-Riemann equations, analytic functions, harmonic functions, Mobius transformations and their properties.	08	21
6.	Complex Variable - Integration Representation by Fourier Integral, Cauchy's integral theorem and formula, Taylor and Laurent series.	05	15

List of Tutorials:

Sr. No.	Name of Tutorial	Hours
1.	Ordinary Differential Equation-1	2
2.	Ordinary Differential Equation-2	2
3.	Ordinary Differential Equation-3	2
4.	Partial Differential Equation-1	2
5.	Partial Differential Equation-2	4
6.	Laplace Transform-1	4
7.	Laplace Transform-2	2
8.	Fourier Series-1	2
9.	Fourier Series-2	2
10.	Complex Variables -1	2
11.	Complex Variables -2	2
12.	Complex Variables -3	4

Text Book(s):

Title	Author/s	Publication
Advanced Engineering Mathematics	Erwin Kreyszig	Wiley India Pvt. Ltd.
Complex Variables and Applications,	J. W. Brown and R. V. Churchill	McGraw Hill.

Reference Book(s):

Title	Author/s	Publication
Higher Engineering Mathematics	B. S. Grewal	Khanna Publishers
A first course in complex analysis with applications	Dennis G. Zill, Patrick D. Shanahan	Jones and Bartlett Publishers Inc.
Differential Equations for Dummies	Steven Holzner	Wiley India Pvt. Ltd.
Higher Engineering Mathematics	H.K. Dass, Er. Rajnish Verma	S. Chand & Company Pvt. Ltd.

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/111/103/111103070/

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.

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.
- MCQ based examination consists of 20 marks.
- Internal Viva consists of 30 marks.

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

SESH2110	DIFFERENTIAL METHODS & COMPLEX VARIABLE
CO1	Describe 1st and 2nd order odes and pde's.
CO2	Classify differential equations and evaluate linear and nonlinear partial differential equations.
CO3	Apply Laplace transform as a tool which are used to evaluate differential equation.
CO4	Examine the various tests of power series and Fourier series for learning engineering.
CO5	Demonstrate understanding of the basic concepts underlying complex analysis to evaluate definite integrals and infinite series.

Mapping of CO with PO

SESH2110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	1	1								1
CO 2	1	1	1									1
CO 3	2	1	1	1								1
CO 4	2	1	1									1
CO 5	2	2	1	1								1

Mapping of CO with PSO

SESH2110	PSO1	PSO2	PSO3
CO 1	2	1	
CO 2	1	1	
CO 3	1	1	
CO 4	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	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	1, 2, 3, 5
5	Complex Variables	1, 2, 3, 4, 5
6	Complex Integration	1, 2, 3, 4, 5

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME2210
Course Name: Engineering Thermodynamics
Prerequisite Course(s): SEME1030-Elements of Mechanical Engineering

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to
● identify different aspects of thermodynamics and their application.
● interpret different laws of thermodynamics and their application to field and daily life.
● understand various gas laws and equations of state and their application.
● understand the role of entropy, exergy to the universe.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basic Concepts of Thermodynamic** Classical and statistical thermodynamic approach,Thermodynamic: system, properties, states, processes, cycle &equilibrium, Concepts of: control volume and control surface, Specific heat capacity, Internal Energy, Enthalpy, Specific Volume, heat and work.	05	07
2.	**First and Second law of Thermodynamics** First law for a closed system undergoing a cycle and change of state, energy, PMM1, First law of thermodynamics for a non- flow and flow process. Limitations of first law of thermodynamics, Statements of second law of thermodynamics and their equivalence, PMM2, Carnot's theorem, Corollary of Carnot's theorem, Causes of irreversibility.	08	20

Module No.	Content	Hours	Weightage in %
3.	**Entropy** Clausius theorem, property of entropy, Clausius inequality, entropy change in an irreversible process, principle of increase of entropy, entropy change for non-flow and flow processes, third law of thermodynamics, PPM3, Entropy change for phase changing process.	05	15
4.	**Exergy** Energy of a heat input in a cycle, exergy destruction in heat transfer process, exergy of finite heat capacity body, exergy of closed and steady flow system, irreversibility and Gouy-Stodola theorem and its applications, second law efficiency.	05	08

Section II			
Module No.	Content	Hours	Weightage in %
5.	**Vapour Power Cycles** Carnot vapor cycle, Rankine cycle, comparison of Carnot and Rankine cycle, carnot cycle efficiency, variables affecting efficiency of Rankine cycle.	06	15
6.	**Gas Power Cycles** Carnot, Otto and Diesel cycle, Dual cycle, Comparison of Otto, Diesel and Dual cycles, air standard efficiency, mean effective pressure, brake thermal efficiency, relative efficiency, Brayton cycle.	06	15
7.	**Properties of gases and gas mixtures** Avogadro's law, equation of state, ideal gas equation, Vander Waal's equation, reduced properties, law of corresponding states, compressibility chart, Gibbs-Dalton law, internal energy; enthalpy and specific heat of a gas mixtures.	06	12
8.	**Cryogenic Refrigeration System:** Ideal isothermal and reversible isobaric source refrigeration cycles, Joule Thomson system, cascade or pre-cooled joule-Thomson refrigeration systems, expansion engine and cold gas effectiveness for the Philips refrigerators, Gifford single volume refrigerators analysis, COP, FOM, refrigerators, pulse tube refrigerators, various types of pulse tube refrigerator. **Refrigerators using solids as working media** Magnetic cooling, magnetic refrigeration systems, thermal, valves, nuclear demagnetization.	04	08
	TOTAL	45	100

Text Book (s):

Title	Author/s	Publication
Engineering Thermodynamics	P.K. Nag	McGraw-Hill Education

Reference Book(s):

Title	Author/s	Publication
Fundamentals of Thermodynamics	Borgnakke & Sonntag	Wiley India (P) Ltd.
Thermodynamics - An Engineering Approach	Yunus Cengel & Boles	McGraw-Hill Education
Engineering Thermodynamics	Gordon Rogers & Yon Mayhew	Pearson Education Ltd.
Engineering Thermodynamics	Jones and Dugan,	PHI Learning Pvt. Ltd

Web Material Links:

- http://nptel.ac.in/courses/112105123/1

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 Course Coordinator.
- End Semester Examination will consist of 60 marks.

Course Outcome(s):

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

SEME2210	ENGINEERING THERMODYNAMICS
CO 1	Interpret basic terminologies of thermodynamics.
CO 2	Define and demonstrate the laws of thermodynamics and its application in routine life.
CO 3	Interpret the concept of entropy and exergy.
CO 4	Analyze different gas and vapour power cycles and its applications to the diff. power plants.
CO 5	Identify different laws and its application related to gases and its mixtures.

Mapping of CO with PO

SEME2210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1										
CO 2	2	1								2		
CO 3	2	1								1		
CO 4	1	2								2		
CO 5	1	2								2		

Mapping of CO with PSO

SEME2210	PSO1	PSO2	PSO3
CO 1			

CO 2	3		
CO 3	3	3	
CO 4	3	3	
CO 5	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	Basic Concepts of Thermodynamic	1, 2
2	First and Second law of Thermodynamics	1, 2, 3
3	Entropy	1, 2, 3
4	Exergy	1, 2, 3
5	Vapour Power Cycles	2, 5
6	Gas Power Cycles	2, 5
7	Properties of gases and gas mixture	1, 2, 3
8	Refrigeration and Liquefaction	2, 3, 5

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME2220
Course Name: Material Science & Metallurgy
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	-	04	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to
● identify the different materials and their properties described.
● understand the microstructures, crystallography, defects, and phase diagrams of different materials.
● understand the process involved in mechanical testing of materials and their deformation under certain conditions.
● understand the role of heat treatment to achieve desired variation in properties of materials.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Materials** Classification of Engineering Materials, Engineering requirements of materials, Methods/Tools to reveal the different levels of structure. Defects-Point, Line, Planar; Crystal geometry and Crystal Imperfections: Unit Cell, Crystal structure, Bravise lattice, atomic packing, coordination number, crystal structures of metallic elements, crystal directions and planes, Miller indices, Polymorphism or Allotropy. Crystal structure and correlated properties. diffusion processes, Mechanism of crystallization – nucleation and growth, factors influencing nucleation and growth, Imperfections in crystals and their effect on properties, Solute strengthening, Corrosion.	06	12

Module No.	Content	Hours	Weightage in %
2.	**Phase Diagrams and Phase Transformation** Phase, Gibbs's Phase rule, Solubility and Solid Solutions,Iso-morphous alloy system, Eutectoid and Peritecticsystem, Evolution of Microstructure, Phase Transformation-Temperature-Time-Transformation (TTT) and Continuous Cooling Transformation (CCT) Diagrams, Electro Microscopy.	05	10
3.	**Solidification of Metals** Solidification of metals and an alloy, Nucleation and Growth during freezing of pure metal and alloy ingot/a casting Resultant macrostructures; Effects of Structure onMechanical Properties, Methods to control the grain structure resulting from solidification, Solidification defects like porosity and shrinkage and remedies. Cooling curve of pure metal and alloy.	05	10
4.	**Heat Treatment** Annealing and its types, Normalizing, Aus-tempering, Mar-tempering, Quenching and Temper heat treatment, Hardenability, Applications of above processes for theindustrial practices. **Surface hardening processes** Flame and induction hardening, Carburizing, Nitriding and Carbonitriding, Applications of above processes for the industrial practices.	04	13
5.	**Powder Metallurgy** Application and advantages, Production of powder, Compacting, Sintering, Equipment and process capability.	02	05
Section II			
Module No.	Content	Hours	Weightage in %
6.	**Cast Iron and Alloy steel** Iron-Iron Carbide and Iron-carbon diagrams,Transformations resulting into White Cast Iron, Grey CastIron, Malleable Cast Iron, S. G. Iron, Alloy Cast Iron. Their microstructures and correlated properties and applications, IS Codification, Purpose of alloying, General effect of alloying elements on ferrite, carbide, transformation temperature, hardenability and tempering. Types of steel: Chromium, Manganese, Molybdenum and Manganese steels, IS Codification, Tool Steels Classification, properties, applications and IS and ISO Codification.	08	18
	Non-Ferrous Alloys Non-Ferrous Alloys of Aluminium, Magnesium, Copper, Nickel,		

7.	Titanium, Microstructure and mechanical property relationships; Composite, Classification, Processing, Metal Matrix	03	05
8.	**Mechanical Behavior of Metals** Properties of metals, Deformation of metals, Mechanisms of deformation, Deformation in polycrystalline materials, Mechanical testing of materials (destructive & nondestructive) testing methods.	03	12
9.	**Polymers, Ceramics and Composites** Definition, Classification & characteristics of polymers,Types of polymerization, Polymer processing, polymer matrix, properties and applications Elastomers, Properties of ceramic materials, Cermets, Ceramic Matrix, Ceramics, Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride, Processing Composite materials, Fiber reinforced plastic (FRP), Glasses properties and applications.	05	08
10.	**Energy Materials** Issues and challenges of functional nanostructured materials for electrochemical energy storage systems, Primary and Secondary batteries, Lithium ion batteries, Current status and future trends. Capacitor, Electrochemical supercapacitors, Current status and future trends, electro chromic energy storage device, Porous materials to store clear energy gases, Metal organic frame works(MOFs), hydrogen storage, Storage of carbon dioxide, CO_2 capture and conversion.	04	07
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	To understand construction and working of metallographic microscope.	02
2.	To study procedure of specimen preparation for microscopic examinationand to carry out a specimen preparation.	04
3.	To understand what is micro examination, importance of micro examination and to study various ferrous, non-ferrous microstructures.	04
4.	To show the effect of different quenching media like Oil, Water and Brineon the hardness of medium carbon steel.	04
5.	To find out the effect of varying section size on hardenability of steel andobtain hardness distribution curves of hardened steel cross-section.	04
6.	To determine machine defects by dye -penetrant test and magnetic particletest.	04
7.	To determine the hardenability by Jominy end quench test.	04
8.	Study of different heat treatment processes- annealing, normalizing,hardening and tempering, surface and casehardening to improve properties of steel during	04

		processes and applications with the help of mufflefurnace.	
		TOTAL	30

Text Book(s):

Title	Author/s	Publication
Callister's Material Science and Engineering	R. Balasubramaniam	Wiley India

Reference Book(s):

Title	Author/s	Publication
Materials Science and Metallurgy	O. P. khanna	Dhanpatrai Publication
Principles of Materials Science and Engineering	W F Smith	McGraw Hill
Elements of Material Science and Engineering	Lawrence H. Van Vlack,	Pearson Education

Web Material Links:

● http://nptel.ac.in/downloads/113106032/

Course Evaluation:

Theory:

● Continuous evaluation consists of two tests each of 30 marks and 1 hour of duration andaverage 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 of practical which should be evaluated out of 10 marks 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 consists of 30 marks during End Semester Exam.
● Viva/Oral performance consists of 30 marks during the End Semester Exam.

Course Outcome(s):

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

SEME2220	MATERIAL SCIENCE & METALLURGY
CO1	Understand the basic concept of material science and metallurgy.
CO2	Know about the ferrous and non ferrous metals and alloys and their applications.
CO3	Understand and apply various heat treatment process to get desired material properties.
CO4	Examine the mechanical properties of metals through various destructive and non destructive methods.
CO5	Understand the importance of powder metallurgy & judge the scope and limitations

of different materials.

Mapping of CO with PO

SEME2220	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	2			3	3	1				3
CO 2	2	3	2			3	3	3	2	1	1	3
CO 3	2	3	2			3	3	3	2		2	3
CO 4	2	3	3	3	3	3	3	3	1	2	2	3
CO 5	2	3	2			3	3		2		1	3

Mapping of CO with PSO

SEME2220	PSO1	PSO2	PSO3
CO 1	1	3	2
CO 2	1	3	1
CO 3	3	3	3
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

Module No	Content	RBT Level
1	Introduction to Materials	1
2	Phase diagrams and phase transformation	1, 2, 4
3	Solidification of Metals	2, 4
4	Heat Treatment, Surface hardening process	3, 5
5	Powder Metallurgy	2, 5
6	Cast Iron and Alloy Steel	1, 2
7	Non Ferrous Alloys	1, 2
8	Mechanical Behaviour of Metals	2, 3, 5
9	Polymers, Ceramics and Composites	2, 4
10	Energy Materials	1,2

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME2231
Course Name: Manufacturing Technology - I
Prerequisite Course(s): -- SEME1020 – Engineering Workshop

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 various manufacturing techniques.
- learn the background for higher level subjects in engineering like Production Technology.
- understand the relevance and importance of the Different manufacturing techniques and real-life application in industry.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Manufacturing Processes** Basic Introduction, Economics and Technological Definition, Importance of Manufacturing, Classification and Selection of Manufacturing Processes.	02	05
2.	**Patternmaking and Foundry** Patterns, Allowances, Types of patterns, Moulding materials, Moulding sands; properties and sand testing: Grain fineness, moisture content, clay content and permeability test. Core materials and core making, Gating & Riser systems, Spure, Gating, Ration, Cupola, Inspection and Cleaning of casting, Casting defects.	12	25
3.	**Miscellaneous Casting Process** Shell moulding, Die casting, investment Casting, Carbon dioxide molding process, Centrifugal casting, Slush casting, Continuous casting process, Advanced technologies in casting.	08	18
Section II			

Module	Content	Hours	Weightage in %
4.	**Gas Welding** Principles of gas welding, Types of gases used, Types of flames, Welding techniques, Edge preparation, Equipment used, Torch, Regulators, Welding filler rods, Gas cutting, Principles of gas cutting, Position of torch, Soldering, Brazing, Adhesive bonding.	08	18
5.	**Electric Arc Welding** Principles of electric arc welding, A.C. / D.C. welding, Edge preparation, Equipment used, ISI electrode classification: Designation and selection, Manual metal arc welding, Carbon arc welding, Inert gas shielded arc welding, TIG & MIG, Submerged arc welding, Atomic hydrogen arc welding, Plasma arc welding, Stud arc welding, Arc cutting.	05	10
6.	**Resistance Welding** Principles of resistance welding, Heat balance, Electrodes, Spot welding, Seam welding, Projection welding, Upset welding, Flash welding, Fusion welding processes: Thermit welding, electro-slag welding, Electron beam and laser beam welding.	04	12
7.	**Green Manufacturing** Why Green Manufacturing, Motivations and Barriers to Green Manufacturing, Environmental Impact of Manufacturing, Strategies for Green Manufacturing. The Social, Business, and Policy Environment for Green Manufacturing: Introduction, The Social Environment—Present Atmosphere and Challenges for Green Manufacturing, The Business Environment: Present Atmosphere and Challenges, The Policy Environment—Present Atmosphere and Challenges for Green Manufacturing.	06	12
	TOTAL	45	100

List of Practical:

Sr No	Name of Practical	Hours
1.	Study of different types of patterns & types of molding methods	02
2.	Design of Gating system & Design of Riser	02
3.	To Find out the Moisture Content, Permeability and Hardness of Moulding Sand	04
4.	Casting Defects, their Causes and Remedies	02
5.	Tutorial on Casting Simulation	04
6.	Study different Welding Processes, Weld Joint Design as per I.S. code and Weld Symbols	04
7.	Gas Welding and Gas Cutting Processes	04
8.	MIG & TIG Welding Process	04

9.	Resistance Welding Process	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Manufacturing Technology Vol. II	P.N. Rao	Tata McGraw Hill
A Textbook of Production Technology	Sharma P. C.	S. Chand

Reference Book(s):

Title	Author/s	Publication
Manufacturing Technology – I	Rao	Tata McGraw Hill
A Textbook of Production Engineering	Sharma P.C.	S. Chand
Manufacturing Processes and Systems	Phillip F., Ostwald, Jairo Munoz	Wiley India
Elements of Workshop Technology V. II	Chaudhary	MPP
Manufacturing technology	Rao	Atul
Work shop Technology -1	Hajra	MPP

Web Material Links:

● https://nptel.ac.in/courses/112107145

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 of practical which should be evaluated out of 10 marks 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 consists of 30 marks during End Semester Exam.
● Viva/Oral performance consists of 30 marks during the End Semester Exam.

Course Outcome(s):

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

SEME2231	MANUFACTURING TECHNOLOGY – I
CO1	Articulate basic knowledge of manufacturing processes to implement in professional skills.
CO2	Describe patternmaking process and casting defects
CO3	Differentiate various casting processes for good manufacturing practices.

CO4	Demonstrate gas welding and cutting process for different application
CO 5	Identify, classify and apply arc & resistance welding processes used for various applications in industrial practice.

Mapping of CO with PO

SEME2231	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2				1						2	
CO 2	2				3		3					2
CO 3	2				2		3		2			2
CO 4	2				3		3	1	2			2
CO 5	2				3		3	1	2			2

Mapping of CO with PSO

SEME2231	PSO1	PSO2	PSO3
CO 1	1	1	1
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	2	2
CO 5	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	Manufacturing Processes	1, 2, 4, 6
2	Patternmaking and Foundry	1, 2, 5, 6
3	Miscellaneous Casting Process	1, 2, 6
4	Gas Welding	1, 2, 5
5	Electric Arc Welding	2, 5, 6
6	Resistance Welding	2, 5, 6
7	Green Manufacturing	1, 2, 3

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV2210
Course Name: Mechanics of Solids
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 different types of forces, systematic evaluation of effect of these forces, behavior of rigid and deformable bodies subjected to various types of forces at the state of rest or motion of the particles.
● understand the stresses developed under the application of force.
● understand the physical and mechanical properties of materials.
● understand the behavior of structural elements under the influence of various loads.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Definition of Rigid Body, Deformable Body, Scalar and Vector Quantities, Fundamental Principles of Mechanics: Principle of Transmissibility, Principle of Superposition, Law of Parallelogram of Forces.	05	11
2.	**Fundamental of Static:** Force, Types of Forces, Characteristics of a Force, System of Forces, Composition and Resolution of Forces. **Concurrent Forces:** Resultant of Coplanar Concurrent Force System by Analytical Method, Law of Triangle of Forces, Law of Polygon of Forces, Equilibrium Conditions for Coplanar Concurrent Forces. **Non-Concurrent Forces:** Moments & Couples, Characteristics of Moment And Couple, Varignon's Theorem, Resultant of Non-Concurrent Forces by Analytical Method, Equilibrium Conditions of Coplanar Non-Concurrent Force System.	06	14
3.	**Centroid and Centre of Gravity:**	05	11

Module No.	Content	Hours	Weightage in %
	Centroid of Lines, Plane Areas and Volumes, Examples Related to Centroid of Composite Geometry, Pappus –Guldinus Theorems.		
4.	**Moment of Inertia:** Parallel and Perpendicular Axis Theorems, Polar Moment of Inertia, Radius of Gyration of Areas, Examples related to moment of Inertia of Composite geometry.	06	14

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Section II

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Module No.	Content	Hours	Weightage in %
5.	**Mechanical Properties of Materials:** Introduction, Classification of Materials, Properties Related to Axial, Bending, and Torsional & Shear Loading, Toughness, Hardness, Ductility, Brittleness. Proof stress, Factor of Safety, Working Stress, Load Factor.	04	12
6.	**Simple Stress and Strain:** Definition of Stress and Strain, Tensile & Compressive Stresses: Shear and Complementary Shear Strains, Linear, Shear, Lateral, Thermal and Volumetric. Hooke's Law, Stresses and Strain in bars of Varying, Tapering & Composite Section, Principle of Superposition. Elastic Constant, Relation between Elastic Constants.	07	15
7.	**Shear Force and Bending Moment:** Introduction, Types of Loads, Supports and Beams, Shear Force, Bending Moment, Sign Conventions for Shear Force & Bending Moment. Statically Determinate Beam, Support Reactions, SFD and BMD for Concentrated Load and Uniformly Distributed Load, Uniformly Varying Load, Point of Contra-flexure.	12	23
	TOTAL	45	100

List of Practical (Any Ten):

Sr. No	Name of Practical	Hours
1.	Equilibrium of coplanar concurrent forces	02
2.	To verify the law of parallelogram of forces	02
3.	To verify the law of polygon of forces	02
4.	To verify the Lami's theorem	02
5.	Equilibrium of parallel force system – simply supported beam	02
6.	Tensile test on Ductile materials.	02
7.	Compression test on Ductile materials	02
8.	Compression test on Brittle Materials	02
9.	Determination of hardness of metals (Brinell/ Rockwell hardness test)	02
10.	Determination of impact of metals (Izod/ Charpy impact test)	02
11.	Tutorial on concurrent & Non-concurrent forces	04
12.	Tutorials on C. G & MI	02
13.	Tutorials on SFD & BMD	04
	TOTAL	30

Text Book(s):

Title	Author(s)	Publication
Applied Mechanics	S. B. Junnarkar & H. J. Shah	Charotar Publication
Strength of Materials (SI Units)	R S Khurmi, N Khurmi	S. Chand & Company Pvt. Ltd.

Reference Book(s):

Title	Author(s)	Publication
Engineering Mechanics,	Meriam and Karaige,	Wiley-India
Engineering Mechanics: Statics and Dynamics	S Rajsekaran	Vikas Publication
Engineering Mechanics of Solids	Popov E.P	Prentice Hall of India
Strength of Materials (SI Units)	Er. R . K. Rajput	S. Chand & Company Pvt. Ltd.
Mechanics of Structure-Vol.I	Dr. H.J. Shah & S. B. Junarkar	Charotar Publishing House Pvt. Ltd.
Strength of materials	R. Subramanian	Oxford Publications
Strength of materials	S. Ramamrutham	DhanpatRai Publishing Company
Strength of Materials (SI Units)	Er. R . K. Rajput	S. Chand & Company Pvt. Ltd.

Web Material Link(s):
- http://nptel.ac.in/courses/122104014/
- http://nptel.ac.in/courses/112103108/

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 of practical which should be evaluated out of 10 marks 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 consists of 30 marks during End Semester Exam.
- Viva/Oral performance consists of 30 marks during the End Semester Exam.

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

SECV2210	MECHANICS OF SOLIDS
CO 1	Identify fundamental principles of mechanics, equilibrium, statics reactions and internal forces in statically determinate beams.
CO 2	Understand,the basics of friction and its importance.
CO 3	Apply principles of statics to determine c.g and m.i of a different geometrical shape.

CO 4	Analyse problems and solve the problem related to mechanical elements and analyse the deformation behaviour for different types of loads.

Mapping of CO with PO

SECV2210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1										
CO 2	2	1	1									
CO 3	2	1										
CO 4	2	1		1	1							

Mapping of CO with PSO

SECV2210	PSO1	PSO2	PSO3
CO 1	3		
CO 2	3		
CO 3	3		
CO 4	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	1, 2,
2	Fundamental of Static	2, 3, 4
3	Centroid and Centre of Gravity	2, 4, 5
4	Moment of Inertia	3, 4, 5
5	Mechanical Properties of Materials	1, 2, 5
6	Simple Stress and Strain	2, 4, 5
7	Shear Force and Bending Moment	3, 4, 5

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH2120
Course Name: Numerical Method & Statistics
Prerequisite Course(s): SESH2110- Differential Methods and Complex Variable

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	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learner to
- provide the knowledge of numerical analysis & statistical methods to the students.
- mentally prepare the students to identify and formulate the engineering problem and obtain their solution.
- inculcate the analytical skill of the students to apply the Numerical & Statistical techniques to the problems of respective field.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Approximations and Errors:** Errors and Their computations, General error formula. **Solution of Algebraic and Transcendental Equations:** Bracketing Methods (Bisection, Secant, Method of False Position), Convergence of Iterative Methods, Newton-Raphson Method, Newton-Raphson Method	7	17
2.	**Numerical Solutions of Linear Equations** Gauss-Seidel Method Iteration Method, Jacobi's Method, Gauss-Seidel Method, Eigen Value Problem.	6	13
3.	**Numerical Differentiation and Integration** Finite Differences: Forward, Backward and Divided Differences Table, Newton's Forward, Backward and Divided Differences Interpolation Formula, Interpolation Polynomials, Lagrange Interpolation Formula Interpolation, Numerical Integration, Trapezoidal Rule, Simpson's 1/3-rule, Simpson's 3/8-rule.	10	20
Section II			
Module	Content	Hours	Weightage in %

4.	**Numerical Methods for ODEs**: Taylor's Series and Euler's Method, Modifications and Improvements in Euler's Method, Runge-Kutta 2nd Order & 4th Order Methods, Milne's Predictor-Corrector Methods, Boundary Value Problems.	7	16
5.	**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 Range, Variance, Standard Deviation, Coefficient of Variation, Regression line and regression coefficient, Karl Pearson's method	7	16
6.	**Probability Distribution** Introduction, Conditional probability, Independent events, independent experiments, Bayes' theorem, Probability distribution, Binomial distribution, Poisson distribution, Normal distribution.	8	18

List of Tutorials:

Sr. No.	Name of Tutorial	Hours
1.	Approximations and Errors	2
2.	Solution of Algebraic and Transcendental Equations	4
3.	Numerical Solutions of Linear Equations	2
4.	Numerical Differentiation and Integration-1	2
5.	Numerical Differentiation and Integration-2	2
6.	Ordinary Differential Equations-1	2
7.	Ordinary Differential Equations-2	4
8.	Basics of Statistics-1	4
9.	Basics of Statistics-2	2
10.	Probability-1	4
11.	Probability-2	2

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
Numerical Methods in Engineering & Science	B. S. Grewal	Khanna Publishers, New Delhi
Advanced Engineering Mathematics	R. K. Jain, S. R. K. Iyengar	Narosa Publishing House, New Delhi.
Introductory Methods of Numerical	S. S. Sastry	PHI Learning Pvt. Ltd., New Delhi.

Analysis.		
Statistics for Business and Economics	David R. Anderson, Dennis J. Sweeney, Thomas A.Williams	Cengage Learning

Web Material Link(s):
- http://nptel.ac.in/courses/111106094/
- http://nptel.ac.in/courses/111105035/
- http://nptel.ac.in/courses/111101003/
- http://nptel.ac.in/courses/111105090/
- http://nptel.ac.in/courses/111107105/
- http://nptel.ac.in/courses/110107114

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.

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.
- MCQ based examination consists of 20 marks.
- Internal Viva consists of 30 marks.

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

SESH2120	NUMERICAL METHODS & STATISTICS
CO 1	Derive numerical solution of linear and nonlinear system of equation.
CO 2	Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration.
CO 3	Compare variety of numerical methods for solving ordinary differential Equation.
CO 4	Construct different statistical methods to collect, compare, interpret & evaluate data.
CO 5	Apply probability in decision making, artificial intelligence, machine learning etc.

Mapping of CO with PO

SESH2120	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	1	1	1								1
CO 2	2	1	1	2								1
CO 3	2	2	1	1								1
CO 4	2	1	1	1								1
CO 5												

Mapping of CO with PSO

SESH2120	PSO1	PSO2	PSO3
CO 1		2	
CO 2		2	
CO 3		2	
CO 4		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	Solution of Algebraic and Transcendental Equations	1, 2, 3, 4, 6
2	Numerical Solutions of Linear Equations	1, 2, 3, 5
3	Numerical Differentiation and Integration	1, 2, 3, 5
4	Numerical Methods for ODEs	1, 2, 3, 5, 6
5	Basics of Statistics	1, 2, 3, 4, 5
6	Probability Distribution	1, 2, 3, 4, 5

Department of Mechanical Engineering

Course Code: SEME2241
Course Name: Machine Drawing
Prerequisite Course(s): SEME1010 - Engineering Graphics

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
00	04	00	02	00	00	100	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the industrial drawing.
- learn a machining and welding symbols.
- know the part and assembly drawings.
- know an application of screw threads, screw fasteners, welding and riveted joints.

List of Practical:

Sr No	Name of Practical	Hours
1.	Sheet of Machining Symbols and Surface Textures	03
2.	Sheet of Types of Screw Threads	03
3.	Drafting Exercise of Types of Nuts and Bolts	04
4.	Sheet of Types of Keys, Cotter and Knuckle Joint	04
5.	Sheet of Types of Riveted Joints, Welding Joints and Welding Symbols	02
6.	Sheet of Plummer Block or Pedestal Bearing	02
7.	Drafting Exercise of Part in Drafting software	12
8.	Parts designing using software tools	10
9.	Study of force analysis using software	13
10.	Assembly and disassembly of parts	07
	TOTAL	60

Text Book(s):

Title	Author/s	Publication
Machine Drawing	N. D. Bhatt, V. M. Panchal	Charotar Publishing House Pvt. Ltd.
Machine Drawing	N. Sidheshwar, P. Kannaiah, V. V. S. Sastry	Tata McGraw Hill Publication

Web Material Links:
- http://nptel.ac.in/syllabus/112106075/

Course Evaluation:

Practical:
- 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 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/drawing/test consists of 30 marks during End Semester Exam.
- Viva/Oral performance consists of 30 marks during the End Semester Exam.

Course Outcome(s):

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

SEME2241	MACHINE DRAWING
CO1	Illuminate machining and welding symbols and its representation in the industrial drawings.
CO2	Interpret and differentiate part and assembly drawing.
CO3	Explore various types of screw threads, screw fasteners, welding, riveted and pin joints and its applications.
CO4	Understand limit, fits and tolerance systems and its representation in drawings.
CO5	Discover the drafting software to create 2D and 3D geometry.

Mapping of CO with PO

SEME2241	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	2		3				3		3
CO 2	2	3	3	3		3				3		3
CO 3	2	3	3	3		3						3
CO 4	2	3	3	3		3		3		3		3
CO 5	2	3	3	3	3	3	1			3		3

Mapping of CO with PSO

SEME2241	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	3	2	
CO 3	2	2	
CO 4	2	2	
CO 5	3	2	3

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

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

Module No	Content	RBT Level
1	Sheet of Machining Symbols and Surface Textures	1, 2,3
2	Sheet of Types of Screw Threads	1, 2, 3
3	Drafting Exercise of Types of Nuts and Bolts	1, 2, 3,4
4	Sheet of Types of Keys, Cotter and Knuckle Joint	1, 2,3,4
5	Sheet of Types of Riveted Joints, Welding Joints and Welding Symbols	1,2,3,4
6	Sheet of Plummer Block or Pedestal Bearing	1,2,3,4
7	Drafting Exercise of Part in Drafting software	1,2,3,4,5
8	Parts designing using software tools	1,2,3,4,5,6
9	Study of force analysis using software	1,2,3,4,5
10	Assembly and disassembly of parts	1,2,3,4

P P Savani University

School of Engineering

Department of Mechanical Engineering

Course Code: SEME2250

Course Name: Fluid Mechanics

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	-	04	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand basic fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydraulics, Marine Engineering, Gas dynamics etc.
- learn Fluid Properties.
- understand the importance of flow measurement and its applications in Industries and to obtain the loss of flow in a flow system.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Properties of Fluids** Density, Viscosity, Surface Tension, Compressibility, Capillary, Vapour Pressure, Bulk Modulus, Cavitation, Classification of Fluids	02	5
2.	**Fluid Statics** Force and Pressure, Pascal's law of Pressure at a point, Pressure measurement by Manometers – U tube, Inclined U tube and Differential, Centre of Pressure, Hydrostatic forces on surface – Vertical, Horizontal and Inclined, Forces on curved Surfaces, Buoyancy and Buoyant Force, Centre of Buoyancy and Meta Centre, Determination of Metacentric Height, Stability of Floating and Submerged Body, Position of metacenter relative to Centre of buoyancy.	06	14
3.	**Fluid Kinematics** Steady and Unsteady Flow, One – two and three Dimensional Flow,		

Module No.	Content	Hours	Weightage in %
	Uniform and Non Uniform Flow, Rotational and Irrotational Flow, Stream Lines and Stream Function, Velocity Potential Function, Relation between stream and velocity potential function, Flow nets, Continuity Equation for 2D and 3D flow in Cartesian co-ordinates system	07	16
4.	**Fluid Dynamics** Newton's law of motion, Euler's Equation and its applications, Bernoulli's Equation and its applications, Momentum Equation,Pitot Tube, Determination of volumetric flow with pitot tube, Principle of Venturimeter, Pipe Orifice and Rotameter.	06	15
Section II			
Module No.	Content	Hours	Weightage in %
5.	**Dimensional Analysis** Dimensions, Dimensional Homogeneity, Raleigh and Buckingham π Theorem, Non-Dimensional Numbers, Similarities – Geometrical, Kinematics and Dynamic.	05	10
6.	**Flow Through Pipes & Open Channels** Major and Minor Losses in Pipes, Losses in Pipe Fittings, Hydraulic Gradient line and Total energy line, Equivalent Pipes,Pipes in series and parallel, Siphon, Power transmission through pipe, Moody's Diagram, Dracy Weishbach Equation, Types of open channel flow, Specific Energy and Specific Force,Critical Flow, Hydraulic Jump, Measurement of Discharge in open Channels.	07	16
7.	**Viscous Flow** Reynolds number and Reynolds experiment, flow of viscous fluid through circular pipe- Hagen Poiseuille formula, Flow of viscous fluid between two parallel fixed plates, power absorbed in viscous flow through - journal, foot step and collar bearing, measurement of viscosity.	04	08
8.	**Boundary Layer Theory** Concept of Boundary Layer, Boundary layer Thickness, Momentum Thickness, Displacement Thickness, Drag and Lift, Separation of Boundary layer, Streamlined and Bluffed Bodies.	04	08
9.	**Nano Fluids** Introduction to nanofluids, nanostructure materials, base fluids, dispersion, sonication and stable suspension. Various types of nanofluids-volumetric concentration. Thermophysical properties: Density; principles of measurement and apparatus. Theoretical equations to determine the density of different nanofluids. Viscosity: principles of measurement and apparatus. Andrade's and other theoretical equations. Effect of volumetric concentration and	04	08

		temperature. Effect of subzero temperature on nanofluid viscosity.		
		TOTAL	45	100

List of Practical:

Sr No	Name of Practical	Hours
1.	Determine metacentric height of floating body.	02
2.	Measurement of pressure using different types of manometers.	02
3.	Determine Co-efficient of Discharge by venturimeter, Orificemeter and Rotameter.	06
4.	Verification of Bernoulli's apparatus.	02
5.	Measurement of velocity of flow using Pitot tube.	02
6.	Measurement of Friction factor for Different pipes.	04
7.	Measurement of viscosity using Redwood Viscometer.	02
8.	Determine discharge through triangular notch.	02
9.	Determine discharge through trapezoidal notch.	02
10.	Determine discharge through rectangular notch.	02
11.	Determine different flow patterns by Reynolds's apparatus.	02
12.	Determine friction loss for different pipes fittings	02
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Textbook of Fluid Mechanics and Hydraulic Machines	R. K. Bansal	Laxmi Publications
Introduction to Fluid Mechanics and Fluid Machines	S.K.Som & Biswas.G	Tata McGraw Hill Publication

Reference Book(s):

Title	Author/s	Publication
Fluid Mechanics	Frank M. White	Tata McGraw Hill Publication
Fluid Mechanics	R.K.Rajput	Schand Publication

Web Material Links:

● http://nptel.ac.in/courses/112105171/1

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 Course Coordinator.

● End Semester Examination will consist of 60 marks.

Practical:
● 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 20 marks.
● Internal viva consists of 20 marks.
● Practical performance/quiz/drawing/test consists of 30 marks during End Semester Exam.
● Viva/Oral performance consists of 30 marks during the End Semester Exam.

Course Outcome(s):

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

SEME2250	FLUID MECHANICS
CO 1	Differentiate fluid properties and its behavior in static and dynamic mode.
CO 2	Apply dimensional analysis to design the system and interpret types of fluid flow.
CO 3	Determine major and minor losses through different pipes.
CO 4	Diagnose the viscosity of fluids.
CO 5	Diagnose pressure exerted by the fluids and rate of flow of fluids.

Mapping of CO with PO

SEME2250	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2			2					3			
CO 2	3	2	2	3					3			
CO 3	3	2		3					3			
CO 4	3	3		3					3			
CO 5	3	1		3					3			

Mapping of CO with PSO

SEME2250	PSO1	PSO2	PSO3
CO 1		2	
CO 2	3	3	
CO 3	3	3	
CO 4	3	3	
CO 5		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	Properties of Fluids	1, 2
2	Fluid Statics	1, 2, 5
3	Fluid Kinematics	1, 2, 5

4	Fluid Dynamics	2, 3, 4, 5
5	Dimensional Analysis	2, 3, 5
6	Flow Through Pipes & Open Channels	2, 3, 4, 5
7	Viscous Flow	2, 3, 4, 5
8	Boundary Layer Theory	2, 3, 4, 5
9	Nano Fluids	1, 2, 3, 4

P P Savani University
School of Engineering
Department of Mechanical Engineering

Course Code: SEME2260
Course Name: Mechanical Measurement & Metrology
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	-	04	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help the learners to

● know various types and methods of measurement.
● assess the suitability of measuring instruments.
● describe the basic concepts of metrology.
● know how to operate different types of mechanical measuring instruments.
● explain the different instruments used in industry.
● evaluate quality of surface produced using various methods of measurements.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Principles of Metrology** Concept of Metrology, Need for inspection, Linearity, Repeatability, Sensitivity and readability, Precision & Accuracy, Standards of measurements.	02	05
2.	**Screw threads and gear Metrology** Measurement of Screw thread: Screw terminology, Errors in threads, measuring elements of the internal and external threads. Measurement of Gear: Introduction and Classification of gears,Forms of gear teeth, Gear tooth terminology, Measurement and testing of spur gear: Various methods of measuring tooth thickness, tooth profile and pitch, Gear Errors.	08	15
3.	**Surface Roughness Metrology** Introduction, Surface Texture, Methods of Measuring Surface finish,	04	09

	Comparison Methods and Direct Instrument Measurement, Sample Length, Numerical Evaluation of Surface Texture, Indication of Surface roughness Symbols used, Adverse effects of poor surface finish		
4.	**Straightness, Flatness, Squareness, Parallelism and Machine Tool Tests** Introduction, Measurement of Straightness, Flatness, Squareness and Parallelism, run out and concentricity, Tool makers microscope, Interferometry and its use in checking flatness, surface contour, parallelism etc., Interferometers andoptical flats, Introduction to Machine tool testing; Various Alignment test on lathe, Milling Machine, Drilling Machine etc.	05	12
5.	**Miscellaneous Metrology** Measurement of Force, Torque, Power, Measurement of displacement, Velocity and Acceleration, Measurement ofSpeed and Frequency	04	09
Section II			
Module No.	Content	Hours	Weightage in %
6.	**Measurement Concept** Economics of measurement, Need of mechanical measurement, Basic definitions: Hysteresis, Linearity, Resolution of measuring instruments, Threshold, Drift, Zero stability, loading effect and system response. Source of Errors and their classification. Methods of measurement and performance characteristics	04	09
7.	**Linear Measurements** Precision and Non-precision linear Measurements, Vernier caliper, Micrometer, Use of End standard – Slip Gauge, Indian standard on Slip gauge, Care and use of slip gauge for workshop and inspection purpose, Telescopic gauge, Comparators.	06	14
8.	**Angular and Taper Measurements** Introduction; Working principle and construction of Angular Measuring instruments like Protractors, Sine bars, Sine Centre,Angle gauges, Spirit level, Clinometers, Angle dekkor, Taper Measuring Instruments: Measurement of taper shafts and Holes	04	09
9.	**Temperature measurement** Temperature scales, Temperature measuring devices, Methods of Temperature Measurement, Expansion Thermometers;Filled System thermometers; Electrical Temperature Measuring Instrument, Pyrometers; Calibration of Temperature Measuring Instruments, Reliability and calibration.	04	09

10.	**Inspection Technologies** History of Coordinate Measuring Machines, Important feature of CMM, CMM construction, CMM Operation and Programming, Performance of CMM, Possible causes of errors in CMM, Trigger type and Measuring type probes in computer controlled CMM, Accuracy Specification for CMM, Calibration of CMM, CMM Applications and Benefits, Role of computer in field of Metrology, Advances in Metrology.	04	09
	TOTAL	45	100

List of Practical:

Sr No	Name of Practical	Hours
1.	Study of various instrument characteristics	02
2.	Study, Use and calibration of Linear Measuring Instruments	08
3.	Study and use of slip gauge	02
4.	Study of angle measurement using (a) Bevel Protractor (b) Combination Set and (c) Sine Bar	08
5.	Study of Temperature Measurement	02
6.	Study of Surface Roughness Tester	02
7.	Study of Gear Tooth Measurement	02
8.	Study Strain gauge Transducer	04
9.	Study of Coordinate Measuring Machines (CMM) (Industrial Visit)	-
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Textbook Of Metrology	M. Mahajan	Dhanpat rai & Co.
Mechanical Measurements & Control	D. S. Kumar	Metropolitan books co pvt ltd

Reference Book(s):

Title	Author/s	Publication
Mechanical Measurement and Metrology	R K Jain	Khanna Publisher
Mechanical Measurements and Instrumentations	R K Rajput	Kataria Publication
Mechanical Measurements	Beckwith & Buck	Narosa publishing House
Metrology and Measurement	Anand Bewoor & Vinay Kulkarni	McGraw-Hill

Web Material Links:

- http://nptel.ac.in/courses/112106179

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 of practical which should be evaluated out of 10 marks 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 consists of 30 marks during End Semester Exam.
- Viva/Oral performance consists of 30 marks during the End Semester Exam.

Course Outcome(s):

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

SEME2260	MECHANICAL MEASUREMENT & METROLOGY
CO 1	Select linear and angular measuring instrument for measurement of various components
CO 2	Distinguish between various gears and screws by measuring their dimensions
CO 3	Measure surface finish of the component produced
CO 4	Compare appropriate temperature measuring device for various applications
CO 5	Describe methods of measurement for various quantities like force, torque, power, displacement.

Mapping of CO with PO

SEME2260	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2				1						2	
CO 2	2				3		3					2
CO 3	2				2		3		2			2
CO 4	2				3		3	1	2			2
CO 5	2				3		3	1	2			2

Mapping of CO with PSO

SEME2260	PSO1	PSO2	PSO3
CO 1	1	1	1
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	2	2
CO 5	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	Principles of Metrology	1,2, 3
2	Screw threads and gear Metrology	2, 4, 5
3	Surface Roughness Metrology	2, 4 , 5
4	Straightness, Flatness, Squareness, Parallelism and Machine Tool Tests	2, 4, 5
5	Miscellaneous Metrology	2, 3, 4, 5
6	Measurement Concept	2, 4, 5
7	Linear Measurements	2, 5
8	Angular and Taper Measurements	2, 5
9	Temperature Measurement	2, 5
10	Inspection Technologies	2, 3, 4, 5

P P Savani University
School of Engineering
Department of Mechanical Engineering

Course Code: SEME2270
Course Name: Theory of Machines
Prerequisite Course(s): SECV1030-Engineering Mechanics

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 the leaners to learn:
- basics types of mechanism, degree of freedom, joints.
- about velocity and acceleration analysis for different mechanism.
- about kinematic analysis of cam and follower motion.
- about types of belts, ropes, chain and gears drives and its applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basics of Mechanisms** Introduction, Mechanism and machine, Rigid and resistant body, Link, Kinematic pair, Types of motion, Degrees of freedom (mobility), Classification of kinematic pairs, Kinematic chain, Linkage, Mechanisms, Kinematic inversion, Inversions of slider crank chain, Synthesis of Mechanism, Double slider- crank chain, Quick return mechanism, Limiting Positions and Mechanical Advantage.	06	10
2.	**Velocity Analysis** Vectors, Displacement of a rigid body, Relative displacement, Definition of velocity, Angular velocity, Rotation of a rigid body, Translation and rotation of a rigid body, Relative velocity method (graphical and analytical), Instantaneous axes of motion, Properties of instantaneous centers, The Aronhold - Kennedy theorem of three centers, Velocity analysis by instantaneous centers. The line-of-centers method, Velocity analysis by components, Velocity images, Velocity diagrams.	12	20

3.	**Acceleration Analysis** Definition of acceleration, Angular acceleration, A general case of acceleration, Radial and transverse components of acceleration, The coriolis component of acceleration, Examples of acceleration analysis, Acceleration diagrams.	12	20
	Section II		
Module No.	Content	Hours	Weightage in %
4.	**Kinematics of Belts, Ropes and Chain Drives** Introduction, Belt and rope drives, Open and crossed belt drives, Velocity ratio, Slip, Materials for belt and ropes, Law of belting, Length of belt, Ratio of friction tensions, Power transmitted, Centrifugal effect on belts, Maximum power transmitted by a belt, Initial tension, Creep, Chains, Chain length, Angular speed ratio, Classification of chains.	07	10
5.	**Kinematics of Gears** Introduction, Classification of gears, Gear terminology, Law of gearing, Velocity of sliding, Forms of teeth, Cycloidal profile teeth, Involute profile Teeth, Comparison of Cycloidal and involute tooth forms, Path of contact, Arc of contact, number of pairs of teeth in contact, Interference in involute gears, Minimum number of teeth, Interference between rack and pinion, Undercutting, Introduction to helical, Spiral, Worm, Worm gear and bevel gears.	15	20
6.	**Kinematics of Cams** Introduction, Types of cams, Types of followers, Cam terminology, Displacement diagrams, Motions of the follower, Graphical construction of cam profile, High Speed CAM.	08	20
	TOTAL	60	100

List of Practical:

Sr No	Name of Practical	Hours
1.	To measure the ratio of time of cutting stroke to the return stroke in shaping machine by varying the stroke length.	02
2.	To understand the ratio of time of cutting stroke to the return stroke in shaper machine by varying the stroke length.	08
3.	To estimate kinematic data related to bicycle free wheel sprocket mechanism and Geneva mechanism.	02
4.	To prepare different kinematic links and to determine velocity and acceleration by relative velocity method for analysis of motion links.	08
5.	To draw a radial cam profile for given follower type to obtain desired follower motion.	02
6.	To estimate the slip, length of belt, angle of contact in open and cross belt drive.	02

7.	To assemble and dismantle different clutches.	02
8.	To measure radius and height of all types of governors for different rotational speeds and mass of balls.	04
9.	To perform balancing of rotating unbalanced system.	-
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Theory of Machines	S. S. Rattan	Tata McGraw Hill Education
Theory of Machines and Mechanisms	John J. Uicker, Gordon R. Pennock, Joseph E. Shigley	Oxford University Press

Reference Book(s):

Title	Author/s	Publication
Mechanism and Machine Theory	J.S Rao, R.V Dukkipati	Wiley Eastern Ltd.
Theory of Mechanism and Machine	Ghosh A., Malick A.K	East-West Pvt. Ltd.

Web Material Links:

● http://nptel.ac.in/courses/112104121/1

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 Course Coordinator.
● End Semester Examination will consist 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 20 marks.
● Internal viva consists of 20 marks.
● Practical performance/quiz/drawing/test consists of 30 marks during End Semester Exam.
● Viva/Oral performance consists of 30 marks during the End Semester Exam.

Course Outcome(s):

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

SEME2270	KINEMATICS OF MACHINERY
CO 1	Understand the essential components of linkage and mechanism in the assembly of machines.
CO 2	Analyze the assembly with respect to the displacement, velocity, and acceleration at any point in a link of a mechanism.
CO 3	Apply the concept of the belt, rope, chains, and gear drives in machines operations.

CO 4	Understand a power transmission machine's element and its mechanism to solve the problems associated with it.
CO 5	Design a layout of cam and follower for specific motion.

Mapping of CO with PO

SEME2270	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	1										
CO 2	1	1		1	1							
CO 3	1	1			1							
CO 4	1	1		1								
CO 5	1	1		1	1							

Mapping of CO with PSO

SEME2270	PSO1	PSO2	PSO3
CO 1	3	2	
CO 2	3	3	1
CO 3	3	3	2
CO 4	3	2	1
CO 5	3	3	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	Basics of Mechanisms	1, 2
2	Velocity Analysis	1, 2, 3, 5
3	Acceleration Analysis	1, 2, 3, 5
4	Kinematics of Belts, Ropes and Chain Drives	2, 5
5	Kinematics of Gears	2, 5
6	Kinematics of Cams	2, 5