



PPSU

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

**B. TECH.
(COMPUTER SCIENCE & ENGINEERING - DATA SCIENCE)**

SYLLABUS BOOK

AY 2024-25

INSTITUTE VISION

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

INSTITUTE MISSION

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

Graduates will demonstrate ability to:

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

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

PSO No	PROGRAMME SPECIFIC OUTCOMES (PSO) COMPUTER SCIENCE & ENGINEERING - DATA SCIENCE
PSO 1	Develop skills to create software applications in Data Science & Analytics, focusing on data mining, big data processing, predictive analytics, and business intelligence using modern tools and technologies to extract meaningful insights from complex datasets.
PSO 2	Apply Data Science and Analytics methods to solve real-world problems, utilizing statistical analysis, machine learning, and data visualization to support informed decision-making and innovation.
PSO 3	Prepare technically competent employees, researchers, and entrepreneurs, excel in competitive exams, and boost passion for higher studies.

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

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

Syllabus Book

B. Tech. (Computer Science & Engineering - Data Science)

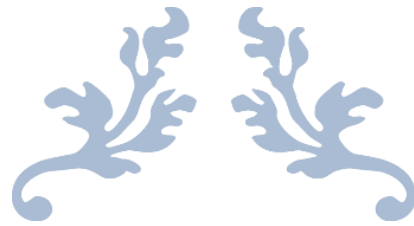


P P Savani University
School of Engineering

Effective From: 2024-25
Authored by: P P Savani University

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FIRST YEAR B. TECH.



P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR FIRST YEAR B.TECH. COMPUTER SCIENCE & ENGINEERING - DATA SCIENCE
PROGRAMME AY: 2024-25

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
1 OR 2	SESH1110	Calculus	SH	3	0	2	5	5	40	60	0	0	100	0	200
	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

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	
3	0	2	5	40	60	0	0	100	0	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.	9	20
2.	Sequence and Series-I Convergence and Divergence, Comparison Test, Integral Test, Ratio Test, Root Test, Alternating Series, Absolute and Conditional Convergence.	9	20
3.	Sequence and Series-II Power series, Taylor and Macluarin series, Indeterminate forms and L'Hospitals Rule.	5	10
Section II			
Module No.	Content	Hours	Weightage in %
4.	Partial Derivatives Function of several variables, Partial differentiation, Applications, Chain rule, Linear approximations, Maxima and Minima, Euler's theorem, Lagrange multiplier.	11	30

5.	Curve tracing Tracing of Cartesian Curves, Polar Coordinates, Polar and Parametric Form of Standard Curves, Areas and Length in Polar co-ordinates	11	20
TOTAL		45	100

List of Tutorials:

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

Text Book:

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

Reference Book:

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

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

Mapping of CO with PO-PSO

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	
3	0	2	5	40	60	0	0	100	0	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Matrix Algebra Elementary Row and Column operations, Inverse of matrix, Rank of matrix, System of Linear Equations, Characteristic Equation, Eigen values and Eigen vector, Diagonalization, Cayley Hamilton Theorem.	12	30
2.	Vector Space Concept of vector space, Subspace, Linear Combination, Linear Dependence and Independence, Span, Basis and Dimension, Row Space, Column Space and Null Space, Rank and Nullity.	11	20
Section II			
Module No.	Content	Hours	Weightage in %
3.	Linear Transformation Introduction of Linear Transformation, Kernel and Range, Rank and Nullity, Inverse of Linear Transformation, Rank Nullity Theorem, Composition of Linear Maps.	9	20
4.	Inner Product Space Inner Product, Angle and Orthogonality, Orthogonal projection, Gram-Schmidt process and QR Decomposition, Least square decomposition.	8	20
5.	Beta and Gamma function Improper Integrals, Convergence, Properties of Beta and Gamma Function, Duplication Formula (without proof)	5	10
TOTAL		45	100

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
5.	Matrix Algebra-1	4
6.	Matrix Algebra-2	2
7.	Vector Space-1	4
8.	Vector Space-2	2
9.	Linear Transformation-1	4
10.	Linear Transformation-2	2
11.	Inner Product Space-1	4
12.	Inner Product Space-2	2
13.	Beta and Gamma function-1	4
14.	Beta and Gamma function-2	2
TOTAL		30

Text Book(s):

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

Reference Book(s):

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

Course Evaluation:**Theory:**

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

Tutorial:

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

Course Outcome(s):

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

SESH1120	LINEAR ALGEBRA & CALCULUS
CO 1	Evaluate linear system using matrices and the knowledge of eigenvalues and eigenvectors for matrix diagonalization
CO 2	Determine the basis and dimension of vector spaces and subspaces.

CO 3	Discuss the matrix representation of a linear transformation given bases of the relevant vector space.
CO 4	Apply vectors, inner products, and linear transformations to real world situations.
CO 5	Classify gamma, beta functions & their relation which is helpful to evaluate some definite integral arising in various branch of engineering.

Mapping of CO with PO-PSO

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

Mapping of CO with PSO

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

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

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

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

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME1110

Course Name: Hardware Workshop

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

Module No.	Contents	Weightage in %
1.	<p>Introduction: Introduction to Various Shops / Sections and Workshop Layouts, Safety Norms to be Followed in a Workshop.</p> <p>Fitting Shop: Introduction of Fitting Shop; Safety; Making a Job as per Drawing including Marking and other Performing Operations.</p> <p>Carpentry and Drilling Shop: Introduction of Carpentry Shop; Preparation of Job as per Drawing including Marking and other Performing Operations.</p> <p>Introduction to Machine Tools: Introduction and Demonstration of various Machine Tools like Lathe, Drilling, Grinding, Hack Saw Cutting etc.</p> <p>Introduction to Welding & Plumbing: Introduction and Demonstration of Welding process. Introduction and Demonstration of Plumbing Shop.</p>	25%
2.	<p>Introduction to Computer Hardware Computer hardware structure, Identify and understand hardware components: CPU, Motherboard, RAM, HDD, SSD, Keyboard, Ports, Mouse, Monitor, Printer, UPS/SMPS, etc.</p> <p>Hardware Maintenance and Troubleshooting Assembling and disassembling a PC, connectors and cables, BIOS setup, Disk management, Device manager, Task manager, Network management, Backup/recovery disk.</p>	25%

3.	Electrical and Electronic Skill: Use of Multimeter. Soldering of electrical circuits having discrete components (R, L, C & diode) and ICs on PCB, connections on Breadboard	25%
4.	Logic Gates: Digital Electronics, Symbol and truth table of Logic gates (OR, AND, NOT, NAND, NOR and EX-OR gate), De morgan's theorem. Cathode Ray Oscilloscope: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only- no mathematical treatment), brief discussion on screen phosphor, visual persistence & Use of CRO for the measurement of voltage (dc or ac frequency, time period. Special features of dual trace, Digital storage Oscilloscope: Block diagram and principle of working.	25%
TOTAL		100

List of Practical:

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-PSO

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	2	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

Module No	Content	RBT Level
1	Introduction, Fitting Shop, Carpentry Shop and Drilling Shop, Introduction to Machine Tools, Welding and Plumbing	2,3,4,6
2	Introduction to Computer Hardware, Hardware Maintenance and Troubleshooting	1,2,3,4,5,6
3	Understand and designing of Electrical circuit	2,3,5
4	Cathode ray oscilloscope and Digital Electronics	1,2,3,5

**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	
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

- 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 %
4.	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
5.	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

6.	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.	2
2.	Installation of any 2 software with required plugins and libraries.	4
3.	Study of Different Operating Systems.	2
4.	Creation of Bootable Pen drive.	2
5.	Installation of Windows OS.	2
6.	Installation of Linux OS using VMWare.	2
7.	Study of Basic commands of Linux/UNIX.	4
8.	Study of Basic commands of DOS.	4
9.	Design logo using Canva.	2
10.	Draw a Flowchart to find maximum of two numbers in either draw.io or Microsoft Visio or LucidChart.	2
11.	Study of different Google Apps.	4
12.	Create a Google Doc and Google sheet and share with 2 classmates.	2
13.	Demonstrate working of HlookUp and VlookUp in Excel.	2
14.	Create different types of charts in Excel.	4
15.	Demonstrate Data Analysis in Excel.	4
16.	Create a Google Website with minimum two pages showing your personal details.	4
17.	Demonstrate embedding of a youtube video and pdf document on a web page in google site.	4
18.	Demonstrate placing Map and hyperlinks on web page in Google Site.	4
19.	Create a wordpress site and create minimum three web pages and menu to navigate between the pages.	4
20.	Demonstrate the use of Accordian in wordpress.	2
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	3	2			1							2
CO 2	3	3	2		3					2		3
CO 3	3	2	1	1	2							3
CO 4	2		3	3	3				1	2		3
CO 5	3		3	2	3			1				3

Mapping of CO with PSO:

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

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

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

Module No	Content	RBT Level
1	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	
2	0	0	2	40	60	00	00	0	0	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 defend 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 %
3.	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 for cyber security, Platform to report and combat cyber crime, Case studies	05	15

4.	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
5.	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.

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
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P P Savani University
School of Engineering

Department of Information Technology

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	00	00	02	40	60	00	00	00	00	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	5	15
2.	Quantitative Ability (Applied & Engineering Mathematics)- Part I Logarithm, Permutation and Combinations, Probability, Profit and Loss, Simple and Compound Interest,	5	35
3.	Quantitative Ability (Applied & Engineering Mathematics) -Part II Time, Speed and Distance, Time & Work, Ratio and Proportion, Mixtures and Allegation	5	20
Section II			
Module No.	Content	Hours	Weightage in %
4.	Data Interpretation Data Interpretation, Tables, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Venn Diagrams	6	20
5.	Logical Reasoning (Deductive Reasoning) Analogy, Blood Relation, Directional Sense, Number and Letter Series, Coding – Decoding, Calendars, Clocks, Seating Arrangement, Syllogism	6	20

6.	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	3	10
TOTAL		30	100

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

Mapping of CO with PSO:

SEIT1120	PSO1	PSO2	PSO3
CO 1	2	2	3
CO 2	2	3	3
CO 3	2	3	3
CO 4	2	3	3
CO 5			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	Quantitative Ability (Basic Mathematics)	1, 3, 5
2,3	Quantitative Ability (Applied & Engineering Mathematics)	1, 2, 3, 5
4	Data Interpretation	2, 3, 6
5	Logical Reasoning (Deductive Reasoning)	2, 4, 5
6	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	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- 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	5	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.	9	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.	9	18
Section II			
Module No.	Content	Hours	Weightage in %
4.	Collection of Data: Introduction, One-dimensional Arrays, Two-dimensional Arrays, Concept of Multidimensional Arrays, Declaring and Initializing String Variables, Arithmetic Operations on Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions, Dictionary, List, Tuples and Sets.	10	20
5.	Functions Introduction to Functions, defining a Function, Calling a Function, Types of Functions, Function Arguments, Anonymous Functions, Global and Local Variables, Recursion	6	15

6.	Building Desktop Application Exploring the Tkinter Library in Python, Creating basic Desktop application using Tkinter	6	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	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	3	2			3			2	2			3
CO 2	2	3			3				2			3
CO 3	3	2			3							3
CO 4	3				3							3

Mapping of CO with PSO:

SECE1120	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	3	2
CO 3	3	2	2
CO 4	3	3	2

Level of Revised Bloom's Taxonomy in Assessment:

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

Module No	Content	RBT Level
1.	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: 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	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Understand 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	6	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	6	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	5	10
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	6	10

Section II			
Module	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 reaction products.	02
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](https://www.iare.ac.in/sites/default/files/lecture%20notes/IARE%20ENS%20LECTURE%20NOTES%202.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	PO11	PO12
CO 1	2	2	1	1			2			2		1
CO 2	1	1	2	3		1	2			1		1

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

Mapping of CO with PSO:

SECH1110	PSO1	PSO2	PSO3
CO 1	1	2	3
CO 2	3	1	1
CO 3	2		2
CO 4	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	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)			Credit	Examination Scheme (Marks)						
Theory	Practical	Tutorial		Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
00	04	00	04	00	00	40	60	00	00	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, Involutess, 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 two Referral Planes; Concept of Auxiliary Projection Method.	15	30%
Section II			

Module No.	Content	Hours	Weightage in %
4.	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%
5.	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%
6.	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		45	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:

SECH1120	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:

SECH1120	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

P P Savani University

School of Engineering

Department of Civil Engineering

Course Code: SECV1110

Course Name: Core Engineering Concepts.

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- 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 earthquake 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 %
4.	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
5.	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
6.	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
7.	Basics of Steam Generators: Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox Boiler, Functioning of Different Mountings and Accessories	LAB	08
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 20 marks 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 equipments 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
CO6	Apply fundamental electrical laws and circuit theorems to electrical circuits.

Mapping of CO with PO:

SECH1110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	1	2	1	2	1	1	2	1	1
CO 2	3	3	3	2	2	2	2	1	2	2	1	1
CO 3	3	2	2	2	2	2	2	1	2	2	2	1

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

Mapping of CO with PSO:

SECH1110	PSO1	PSO2	PSO3
CO 1	2	2	2
CO 2	2	3	2
CO 3	3	3	3
CO 4	3	2	3
CO 5	3	3	2

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

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

Module No	Content	RBT Level
1	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

P P Savani University
School of Engineering

Course Code: CLSC2180

Course Name: Essentials of Entrepreneurship

Prerequisite Course(s):

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	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, sStartup Failures,	08	20
Section II			
Module No.	Content	Hours	Weightage in %
3.	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
4.	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
TOTAL		30	100

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.



P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

**TEACHING & EXAMINATION SCHEME FOR SECOND YEAR B.TECH. B.TECH. COMPUTER SCIENCE & ENGINEERING - DATA SCIENCE
PROGRAMME AY: 2024-25**

Sem	Course Code	Course Title	Course Category	Offered By	Teaching Scheme					Examination Scheme						
					Contact Hours				Credit	Theory		Practical		Tutorial		Total
					Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
3	SESH2130	Discrete Structures & Graph Theory	Interdisciplinary	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SECE2210	Database Management System	Major/Core	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SECE2221	Data Structures	Major/Core	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SEIT2210	Object Oriented Programming with Java	Major/Core	IT	3	2	0	5	4	40	60	40	60	0	0	200
	SEIT2220	Software Engineering	Major/Core	IT	3	0	1	4	4	40	60	0	0	100	0	200
	CFLS2140	Upper Intermediate Communicative English	AEC	CFLS	2	0	0	2	2	100	0	0	0	0	0	100
	CLSC2020	IPDC-I	VAC	CLSC	2	0	0	2	2	100	0	0	0	0	0	100
					Total	28	25								1200	
4	SESH2140	Differential Equations & Statistics	Interdisciplinary	SH	3	0	2	5	5	40	60	0	0	100	0	200
	SECE2231	Computer Organization	Major/Core	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SECE2240	Computer Networks	Major/Core	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SEIT2230	Operating System	Major/Core	IT	3	2	0	5	4	40	60	40	60	0	0	200
	SEIT2241	Mobile Application Development	Major/Core	IT	0	4	0	4	2	0	0	40	60	0	0	100
	CLSC2030	IPDC-II	VAC	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: SESH2130

Course Name: Discrete Structures & Graph Theory

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Set, Relation & Function Sets, Set operations, Introduction of Relations, Relations of Sets, Types of Relations, Properties of Relations, Equivalence Relation, Partial Ordering, Hasse Diagram, GLB & LUB, Functions, Classification of functions, Types of functions	08	17
2.	Lattices Definition & properties of Lattice, Lattices as Algebraic System, Sublattices, Types of lattices, Distributive lattices, Modular lattices, Complemented lattices, Bounded lattices, Complete lattices, Finite Boolean algebra	07	16
3.	Group Theory Binary operations, Properties of Group, Groupoid, semigroup & monoid, Abelian group, Subgroup, Cosets, Normal subgroup, Lagrange's theorem, Cyclic group, Permutation group, Homomorphism & Isomorphism of groups.	08	17
Section II			
Module No.	Content	Hours	Weightage in %
4.	Mathematical Logic and Proof Propositions, logical operators, Algebra of proposition, Predicates & quantifiers, Nested Quantifiers, Rules of Inference, Proof Methods, Program Correctness techniques.	06	14
5.	Graph Theory Graphs and Graph Models, Graph Terminology and Types of graphs, Representing graphs and Isomorphism, Connectivity, Euler and Hamilton Paths-Circuits, Applications of weighted graphs.	08	18
6.	Tree		

	Introduction to Trees, Rooted Tree, Properties of tree, Binary tree, Tree Traversal, Spanning Tree, DFS, BFS, Minimum Spanning Tree, Prim's Algorithm, Kruskal's Algorithm.	08	18
	TOTAL	45	100

List of Tutorial(s):

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Tutorial:

- Continuous Evaluation consists of the performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 50 marks.
- Assignment consists of 20 marks.
- Internal viva consists of 30 marks.

Course Outcome(s):

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

SESH2130	DISCRETE STRUCTURES & GRAPH THEORY
CO 1	Summarize the concepts of set theory for understanding & fetching data from a database using query.
CO 2	Classify the basic concepts of spanning tree algorithms namely DFA, BFS, prim's and Kruskal's in the design of networks.
CO 3	Construct the algorithm of group theory for data encryption.
CO 4	Combine the design, foundational concepts of notations and results of graph theory used for better understanding of problems.

Mapping of CO with PO

SESH2130	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	1								1
CO 2	3	3	1	1								3
CO 3	2	2	1	1								1
CO 4	3	3	1	1								3

Mapping of CO with PSO

SESH2130	PSO1	PSO2	PSO3
CO 1	1	2	
CO 2	2	2	
CO 3	1	1	
CO 4	3	1	2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Set, Relation & Function	1,2,4,6
2.	Lattices	1,2,3,4,6
3.	Group Theory	1,2,3,5,6
4.	Mathematical Logic and Proof	1,2,3,4,6
5.	Graph Theory	1,2,3,5,6
6.	Tree	1,2,3,5,6

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE2210

Course Name: Database Management System

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to DBMS Introduction and applications of DBMS, Purpose of DBMS, File system versus DBMS, Advantages of DBMS, Database System architecture, Database users, DBA	04	10
2.	Entity-Relationship model Basic concepts, Design process: Attributes, Entity and Relationship, E-R constraints, weak entity sets, extended E-R features: generalization, specialization, aggregation, conversion of E-R diagram into database schema.	07	15
3.	SQL Concepts Basics of SQL, Types of SQL language, Using DDL statements to create and manage tables, defining constraints: primary key, foreign key, unique key, Not null, check, Manipulating data using DML statements, Retrieving data using SQL select statement, SQL conditions in where clause, Built-in functions: numeric, date, string functions, Displaying data from multiple tables using Joins, Aggregate functions with group by and having clause, Subqueries with operators, SQL views, TCL commands: Commit, Rollback, Savepoint, DCL commands: Grant, revoke, query processing steps	12	25
Section II			
Module No.	Content	Hours	Weightage in %
4.	Relational Model Structure of relational databases, Domains, Relations, Relational algebra: fundamental operators and syntax, inner join, outer join, relational algebra queries	05	12
5.	Normalization Functional Dependency: Definition, trivial and non-trivial FD, closure of attributes, closure of FD set, irreducible set of FD, Decomposition	07	15

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

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

- <https://nptel.ac.in/courses/106105175>
- <https://www.youtube.com/watch?v=c5HAWKX-suM>

Course Evaluation:

Theory:

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

- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

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

Course Outcome(s):

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

SECE2210	DATABASE MANAGEMENT SYSTEM
CO1	Understand the importance of back-end design and relational database management system.
CO2	Apply physical data, conceptual data and its conversion into relational databases.
CO3	Practice various database constraints on relational databases.
CO4	Design and develop database for the software projects.

Mapping of CO with PO

SECE2210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	1	1								
CO 2	2	1	1	1								
CO 3	2	1		1								
CO 4	2	1	1	1								

Mapping of CO with PSO

SECE2210	PSO1	PSO2	PSO3
CO 1	2	1	2
CO 2	2	1	2
CO 3	2	1	2
CO 4	3	2	2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction to DBMS	1,2
2.	Entity-Relationship model	1,2,3
3.	SQL Concepts	4,6
4.	Relational Model	3,4
5.	Normalization	2,3
6.	Transaction Management	2,3,4
7.	Basic of PL/SQL	2,4,6

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE2221

Course Name: Data Structures

Prerequisite Course(s): Introduction to Computer Programming (SECE1020)

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to Data Structures Basic Terminology, Classification of Data Structures: Primitive and Non-Primitive, Linear and Non-linear, Operations on Data Structures.	04	10
2.	Array Array Representation, Array as an Abstract Data Type, Programming Array in C, Sparse Matrices, Sparse Representations, and its Advantages, Row-measure Order and Column-measure Order representation.	04	10
3.	Searching and Sorting Linear Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Radix sort.	04	10
4.	Stack and Queue Stack Definition and concepts, Operations on stack, Programming Stack using Array in C, Prefix and Postfix Notations and their Compilation, Recursion, Tower of Hanoi, Representation of Queue, Operation on Queue, Programming Queue using Array in C. Types of Queue, Applications of Stack & Queue.	07	15
5.	Linked List-Part I Dynamic Memory Allocation, Structure in C, Singly Linked List Doubly Linked List, circular linked list.	03	05
Section II			
Module No.	Content	Hours	Weightage in %
6.	Linked List-II and Applications of Linked List Linked implementation of Stack, Linked implementation of Queue, Applications of Linked List.	03	08
7.	Trees and Graphs Graph Definition, Concepts, and Representation, Types of Graphs, Tree Definition, concepts, and Representation. Binary Tree, Binary Tree Traversals, conversion from general to Binary Tree. Threaded	12	25

	Binary Tree, Heap, Binary Search Tree. Tree for Huffman coding, Breadth First Search, Depth First Search, Spanning Tree, Kruskal's and Prim's Minimum Cost Spanning Tree Algorithms, Dijkstra's Shortest Path Algorithm.		
8.	Hashing The Symbol Table Abstract Data Types, Hash Tables, Hashing Functions, Hash collision Resolution Technique, Linear Probing.	04	10
9.	Advanced Search Structures AVL Trees. 2-3 Trees. 2-3-4 Trees. Red-Black Trees. B-Trees. B+ Tree Splay Trees. Digital Search Trees. Tries.	04	07
	TOTAL	45	100

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SECE2221	DATA STRUCTURES
CO 1	Differentiate primitive and non-primitive data structures.
CO 2	Understand the concept of dynamic memory management.
CO 3	Apply algorithm for solving problems like sorting, searching, insertion and deletion of data.
CO 4	Describe the hash function and concepts of collision and its resolution methods.

Mapping of CO with PO

SECE2221	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1		2								
CO 2	2	1		1							1	
CO 3	2	2		2	1	2						
CO 4	2	1		2			1				1	

Mapping of CO with PSO:

SECE2221	PSO1	PSO2	PSO3
CO 1		1	
CO 2	2	1	2
CO 3	2	1	1
CO 4	2	2	2

Level of Revised Bloom's Taxonomy in Assessment:

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

Module No	Content	RBT Level
1.	Introduction to Data Structures	1,2,4
2.	Array	1,2,3
3.	Searching and Sorting	2,4,5
4.	Stack and Queue	1,2,3,4
5.	Linked List-Part I	1,2,3
6.	Linked List-II and Applications of Linked List	2,3,6
7.	Trees and Graphs	2,3,4
8.	Hashing	2,3,4
9.	Advanced Search Structures	2,3,4

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT2210

Course Name: Object Oriented Programming with Java

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Fundamental of Object-Oriented Programming: History of Java, Basic overview of java, Bytecode, JVM, Buzz- words, Application and applets, Constants, Variables, Data Types, Comments, Operators, Control Flow	04	06
2.	Class Fundamentals: General form of class, Creating class Overloading methods, Constructor, Declaring Object, Returning objects, using objects as parameters, assigning object reference variables, Introducing Access control, understanding static, introducing final, the finalize () method, This keyword, Garbage collection.	06	17
3.	Array & String Handling: Array basics, String Array, String class, String Buffer class, String Tokenizer Class and Object Class.	06	10
4.	Inheritance, Interfaces & Packages: Inheritance: Using super creating multilevel Hierarchy, method overriding, Dynamic method dispatch, abstract classes, using final with Inheritance, Using Package: Defining package, finding package and CLASSPATH, Access protection, importing package, Interface: Defining Interface, Implementing Interface, Variables in Interface.	06	17
Section II			
Module No.	Content	Hours	Weightage in %
5.	Exceptions Handling: Exception types, Try...Catch...Finally, Throw, Throws, creating your own exception subclasses.	06	14
6.	Multithreaded Programming: Life cycle of thread, thread methods, thread priority, thread	08	18

	exceptions, Implementing Runnable interface, Synchronization.		
7.	GUI Programming & Lambdas and Streams: Introduction to Annotation, Byte streams and character streams, Wrapper classes, Why Lambda Expression, Lambda Expression Syntax, where to use lambda expression, Adopting Patterns like matching, finding and filtering, Swing overview, Swing component classes: AbstractButton, ButtonGroup, ImageIcon, JApplet, JButton, JCheckBox, JComboBox, JLabel, JRadioButton, JScrollPane, JTabbedPane, JTable, JTextField, JTree.	09	18
TOTAL		45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to Java Environment and NetBeans	02
2.	Implementation of Java programs with classes and objects	02
3.	Implementation of Java programs to create functions, constructors with overloading and overriding	02
4.	Implementation of Java programs to demonstrate different access specifiers	02
5.	Implementation of Java programs for variables, data types, operators	02
6.	Implementation of Java programs to use arrays and string	02
7.	Implementation of Java programs for inheritance (single, multilevel, hierarchical)	02
8.	Implementation of Java programs to demonstrate the use of super keyword	02
9.	Implementation of Java programs for Interface	02
10.	Implementation of Java programs to demonstrate Java packages	02
11.	Implementation of Java programs for exception handling using all keywords (try, catch, throw, throws and finally)	02
12.	Implementation of Java programs to demonstrate the life cycle of thread	02
13.	Implementation of Java programs for the concepts of thread priority, synchronization, inter-thread communication	04
14.	Implementation of Java AWT programs to Create Registration Form	02
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Java The Complete Reference	Herbert Schildt	McGraw Hill

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.

- Faculty evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical:

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

Course Outcome(s):

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

SEIT2210	Object Oriented Programming with Java
CO 1	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings, and function for developing skills of logic building activity.
CO 2	Use of a variety of basic control structures including selection and repetition; classes and objects in a tiered architecture (user interface, controller, and application logic layers)
CO 3	Demonstrates how to achieve reusability using inheritance, interfaces, and packages and describes faster application development that can be achieved.
CO 4	Demonstrate understanding and use of different exception handling mechanisms and concepts of multithreading for robust faster and efficient application development.
CO 5	Identify and describe common abstract user interface components to design GUI in Java using Swing along with a response to events. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture

Mapping of CO with PO

SEIT2210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3									
CO 2	3	2	3	2	1							
CO 3		2	2	3	2						1	1
CO 4	1	1	1	1	3						2	2
CO 5	1	1	1	2	3			1			2	1

Mapping of CO with PSO

SEIT2210	PSO1	PSO2	PSO3
CO 1			1
CO 2	1	3	
CO 3			1
CO 4	3		
CO 5	2	2	1

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Fundamental of Object-Oriented Programming	1,2
2.	Class Fundamentals	1,2
3.	Array & String Handling	3,4
4.	Inheritance, Interfaces & Packages	2,3,4

5.	Exceptions Handling	2,3
6.	Multithreaded Programming	2,3
7.	GUI Programming & Lambdas and Streams	2,3,4

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT2220

Course Name: Software Engineering

Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	--	01	04	40	60	--	--	100	--	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Study the pioneer of Software Development Life Cycle, Development models, and Agile Software Development.
- Study fundamental concepts in software testing, including software testing objectives, processes, criteria, strategies, and methods.
- Discuss various software testing issues and solutions in software unit tests; integration, regression, and system testing.
- Learn the process of improving the quality of software work products.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to Software and Software Engineering The Evolving Role of Software, A Crisis on the Horizon and Software Myths, Layered Technologies, Processes, Methods and Tools, Generic View of Software Engineering, Study of Different Models-Waterfall model, Incremental model, Evolutionary process models- Prototype, Spiral, and RAD model.	06	15
2.	Agile Development Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools.	04	10
3.	Requirement Analysis and Specification Problem Recognition, Understanding the Requirement, Requirement Modelling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.	05	10
4.	Structured Software Design Design Concepts, Design Model, Software Architecture, Data Design, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design), User Interface Design, Web Application Design.	08	20
Section II			
Module No.	Content	Hours	Weightage in %
5.	Software Coding & Testing Programming principles, Coding Standards and coding Guidelines, Unit testing; Metrics, Software testing fundamentals, Black-box and white box testing, Basis path testing, Control structure testing, Black-box testing - Graph-	08	20

	based testing method, Boundary value analysis; Testing strategies - A strategic approach to software testing, Test strategies for conventional and object-oriented software, test case generation and tool support, Metrics – Coverage analysis-reliability.		
6.	Quality Assurance Quality Control, Assurance, Cost, Reviews, Software Quality Assurance, Approaches to SQA, Reliability, Quality Standards-ISO9000 and 9001.	04	08
7.	Software Project Management Scope and Feasibility, Effort Estimation, Schedule and staffing, Quality Planning, Risk management- identification, assessment, control, project monitoring plan, Detailed Scheduling. Six Sigma for SE, Management Spectrum, People –Product – Process- Project, W5HH Principle, Importance of Team Management.	06	10
8.	Software Maintenance and Configuration Management Types of Software Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering, The SCM Process, Identification of Objects in the Software Configuration, Version Control and Change Control.	04	07
TOTAL		45	100

List of Tutorials:

Sr. No.	Name of Tutorial	Hours
1.	To select the project title and apply requirement engineering to it.	01
2.	To perform the system analysis: Requirement analysis, SRS.	01
3.	To perform the function-oriented diagram: DFD and Structured chart.	01
4.	To perform the user's view analysis: Use case diagram.	01
5.	To draw the structural view diagram: Class diagram.	01
6.	To draw the behavioral view diagram: Sequence diagram, Activity diagram.	02
7.	To study various testing tools.	01
8.	To design test cases.	01
9.	To study cost estimation and preparation of timeline chart.	01
10.	To study the different types of performance testing.	01
11.	To study the usage of regression testing.	01
12.	To understand the usage of software metrics.	01
13.	Project Work: Understand the importance of the SDLC approach & various processes.	02
TOTAL		15

Text Book(s):

Title	Author/s	Publication
Fundamentals of Software Engineering	Fundamentals of Software Engineering	Fundamentals of Software Engineering
Rajib Mall	Rajib Mall	Rajib Mall

Reference Book(s):

Title	Author(s)	Publication
Software Engineering – An Engineering Approach	James F. Peters & Witold Pedrycz	Wiley
Software Engineering	IAN Sommerville	Pearson Education

Web Material Link(s):

- <https://nptel.ac.in/courses/106101061/>

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 practical performance which should be evaluated out of 10 for each Tutorial and the average will be converted to 50 marks.
- Internal viva consists of 50 marks.

Course Outcome(s):

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

SEIT2220	Software Engineering
CO 1	Cite the process of requirement gathering, classification, specification, and validation in the software engineering process.
CO 2	Demonstrate an ability to design the software by applying the software engineering design principles.
CO 3	Discover system design patterns, and agile methodologies for the development of software using UML and Scrum.
CO 4	Devise project planning, cost estimation, and quality management techniques.
CO 5	Assess the software testing process to analyze the functionality of the application.

Mapping of CO with PO

SEIT2220	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	2				1					
CO 2	2	2	2		1		2				3	3
CO 3	2	2	2		1		2				3	3
CO 4	2	1	1		1		2				2	3
CO 5	2	1	1		1		2				3	3

Mapping of CO with PSO

SEIT2220	PSO1	PSO2	PSO3
CO 1			2
CO 2	1		2
CO 3	1		2
CO 4	1		2
CO 5	1	1	2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction to Software and Software Engineering	1,2
2.	Agile Development	2,3
3.	Requirement Analysis and Specification	2,3,4
4.	Structured Software Design	2,3,6
5.	Software Coding & Testing	2,3,4
6.	Quality Assurance	1,2
7.	Software Project Management	2,3,4

8.	Software Maintenance and Configuration Management	2,3,4
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**P P Savani University
School of Engineering**

Department of Science & Humanities

Course Code: SESH2140

Course Name: Differential Equations & Statistics

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

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

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

List of Tutorial(s):

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:**Theory:**

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

Tutorial:

- Continuous Evaluation consists of the performance of tutorial, which will be evaluated out of 10 per each tutorial and average of the same will be converted to 50 marks.
- Assignment consists of 20 marks.
- Internal viva consists of 30 marks.

Course Outcome(s):

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

SESH2140	DIFFERENTIAL EQUATIONS & STATISTICS
CO 1	Describe 1 st and 2 nd order ODEs and PDEs.
CO 2	Classify differential equations and evaluate linear & non-linear partial differential equations.
CO 3	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
CO 4	Elaborate analysis of categorical data and quantitative data.
CO 5	Adapt the knowledge of various probability distribution and their applications in mathematical models, sport strategies and insurance.

Mapping of CO with PO

SESH2140	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1									3
CO 2	3	2	1									3
CO 3	3	2	1									3
CO 4	2	1	1									1
CO 5	2	1	1									1

Mapping of CO with PSO

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

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Ordinary Differential Equation	1, 2, 3, 5
2.	Partial Differential Equation	1, 2, 4, 5
3.	Laplace Transform	1, 2, 4, 5
4.	Fourier Series & Fourier Integral	1, 2, 3, 4, 5
5.	Basics of Statistics	1, 2, 3, 4, 5
6.	Probability Distribution	1, 2, 3, 4, 5

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE2231

Course Name: Computer Organization

Prerequisite Course(s): NIL

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- provide a comprehensive knowledge of overall basic computer hardware structures.
- learn architectures of various internal and external input output systems.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Basic Computer Organization and Design Data Representation: Decimal, Binary, Octal and Hexadecimal numbers, Instruction codes, Computer registers, Computer Instructions, Timing and Control, Instruction cycle Memory-Reference Instructions, Input-output and interrupt, Design of Accumulator Unit.	06	15
2.	Programming the Basic Computer Introduction Machine Language, Assembly Language, Assembler, Program loops, Programming Arithmetic and logic operations, subroutines, I-O Programming.	05	08
3.	Computer Arithmetic Introduction, Addition and subtraction, Multiplication and Division Algorithms, Floating Point Arithmetic.	06	12
4.	Central Processing Unit Introduction, General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation, Program Control, Reduced Instruction Set Computer (RISC).	06	15
Section II			
Module No.	Content	Hours	Weightage in %

5.	Pipeline Control and Parallel Processing Flynn's taxonomy, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction, Pipeline Hazards, Pipeline Performance, RISC Pipeline.	08	20
6.	Input-Output Organization Types of Peripherals, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA	06	15
7.	Memory Organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.	08	15
TOTAL		45	100

List of Practical:

Sr No	Name of Practical	Hours
1.	Study and implement programs on number system	08
2.	Study and implement programs on conversion	04
3.	Study and build different logic gates using Logisim.	04
4.	Study and build different circuits using Logisim.	14
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Computer System Architecture	M. Morris Mano	Pearson
Structured Computer Organization, 6 th Edition	Andrew S. Tanenbaum and Todd Austin	PHI

Reference Book(s):

Title	Author/s	Publication
Computer Architecture & Organization	M. Murdocca & V. Heuring	WILEY
Computer Architecture and Organization	John Hayes	McGrawHill

Web Material Link(s):

- <https://nptel.ac.in/courses/106106092/>

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SECE2231	COMPUTER ORGANIZATION
CO 1	Describe the design and working of basic components used to build computer system.
CO 2	Visualize and understand the working of cpu, different instruction formats, addressing modes, pipeline and vector processing and evaluate the performance of pipeline approach.
CO 3	Describe the requirements of different memories and evaluate memory management techniques.
CO 4	Examine the working mechanism of input and output devices and information transfer.

Mapping of CO with PO

SECE2231	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	1	1								1
CO 2	3	2	1									1
CO 3	3	2	1	1								
CO 4	3	2	1									1

Mapping of CO with PSO

SECE2231	PSO1	PSO2	PSO3
CO 1	2	1	2
CO 2	2	1	2
CO 3	2	1	2
CO 4	3	2	2

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

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

Module No	Content	RBT Level
1	Basic Computer Organization and Design	2,4
2	Programming the Basic Computer	2,3,4
3	Computer Arithmetic	2,4,5
4	Central Processing Unit	1,2,5
5	Micro-programmed Control	1,2
6	Pipeline and Vector Processing	2,5
7	Input-Output Organization	2,3,4
8	Memory Organization	2,5,6
9	Multiprocessors	2

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE2240

Course Name: Computer Networks

Prerequisite Course(s): Discrete Mathematics, Data and File Structures

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction Overview of network and data communication, types of Networks, Network Topology, Protocol hierarchies, and design issues of layers Interfaces, and services. Reference Model: The OSI reference model, TCP/IP reference model, network standards.	04	10
2.	Physical Layer Transmission media, Data and transmission techniques, Multiplexing, Asynchronous Communication, Wireless transmission, ISDN, ATM, Cellular Radio, Switching techniques issues.	07	15
3.	Data Link Layer Layer design issues, services provided to network layers, Framing, Error control, and Flow control, Data link control and protocols – Simplex protocol, sliding window protocol, Utopia, Stop N Wait, Automatic Repeat Request. Go Back N, Selective Repeat Protocols.	07	15
4.	Medium Access Sub Layer Channel Allocations, Multiple Access protocols- ALOHA, CSMA, CSMA/CD protocols, Collision-free protocols, Limited contention protocols, LAN architectures, IEEE 802 and OSI, Ethernet (CSMA/CD), Bus, Token Ring, DQDB, FDDI, Bridges and recent developments.	05	10
Section II			
Module No.	Content	Hours	Weightage in %
5.	Network Layer A network Layer design issue, Routing algorithms, and protocols – OSPF, BGP, RIP, Congestion Control Algorithms, Internetworking – IPV4 & IPV6, Addressing, N/W Layer Protocols, and subnets.	09	20
6.	Transport Layer Transport services, Design issues, transport layer protocols – TCP & UDP, Congestion Control, QOS and its improvement.	07	15

7.	Application Layer Client-Server Model, WWW, HTTP, DNS, DHCP, FTP, and Email Protocol – IMAP, POP3, SMTP	06	15
TOTAL		45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	To study and prepare LAN cables (cross and straight) using crimping tool, to configure LAN.	02
2.	To study and Physical examine different network device and their usage.	02
3.	Configure switch and router in small network and identify the difference.	02
4.	To Study of network IP – IPv4 & IPv6.	02
5.	Configure Network Topology using Cisco Packet tracer.	04
6.	To monitor network traffic using Wire Shark	02
7.	To get the MAC or Physical Address of the system Using Address Resolution Protocol.	02
8.	To Configure network using Routing Information Protocol (RIP)	04
9.	To configure network state routing protocol (OSPF).	02
10.	To configure Border Gateway Protocol.	02
11.	To configure Application Layer protocols: DHCP and DNS and understand its functionality in Wireshark/ Packet tracer.	02
12.	Understand functionality of TCP & UDP using Wireshark/ Packet Tracer.	02
13.	Understand functionality of HTTP & FTP using Wireshark/ Packet Tracer.	02
TOTAL		30

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SECE2240	COMPUTER NETWORKS
CO 1	Distinguish the working of network protocols, application and OSI reference model and TCP/IP reference model.
CO 2	Comprehend functionality of various protocols and algorithms with various architecture layer.
CO 3	Design computer network configuration.
CO 4	Recognize the technological trends of Computer Networking

Mapping of CO with PO

SECE2240	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	1	1	2							1
CO 2	3	1	1	2	1					1	1	1
CO 3	2	2	2		1					1		
CO 4		2	2	1	1	2	2	1	1	1		1

Mapping of CO with PSO

SECE2240	PSO1	PSO2	PSO3
CO 1	1	1	
CO 2	2	2	1
CO 3	1	1	
CO 4	2		2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction	2,4
2.	Physical Layer	1,2,4
3.	Datalink Layer	2,4
4.	Medium Access Layer	1,2
5.	Network Layer	2,3,5,6
6.	Transport Layer	2,4
7.	Application Layer	2,5

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT2230

Course Name: Operating System

Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to Operating System Basics of Operating System: Definition, Types of Operating System, Operating System Structure, Operating System Services, Concept of Virtualization.	03	07
2.	Processes and Threads Management Concept of Process: Definition, Process State, Process State Transition, Process Control Block, CPU Scheduling: CPU-I/O Burst Cycle, Types of Schedulers, Context Switching, Preemptive and Non- Preemptive Scheduling, Scheduling Criteria, Process Scheduling Algorithms: FCFS, SJF, Priority, Round- Robin, Multilevel Queue, and Lottery Scheduling; Threads, Types of Threads, Multithreading	09	20
3.	Inter Process Communication Race Conditions, Critical Regions, Mutual Exclusion with Busy Waiting, Sleep and Wakeup, Semaphores, Mutexes, Monitors, Message Passing, Classical IPC Problems: The Dining Philosopher Problem, The Readers and Writers Problem	07	15
4.	Deadlocks Resources, Conditions for Deadlocks, Deadlock Modelling, , Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention.	04	08
Section II			
5.	Memory Management Main memory: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging: Introduction to Paging, Translation look-aside buffer (TLB), Structure of Page Table, Virtual memory: Background, Demand Paging, Page Replacement Algorithms: FIFO, Optimal Page Replacement, Least Recently Used, Not Recently Used, Second Chance Page Replacement, Thrashing.	11	25
6.	File Management File Concepts: File Types, File Attributes, File Access Methods, File Operations, Directories: Directories Structure, Path Types, Directory Operations; File Allocation Methods: Contiguous, Linked, Indexed	05	12

	Allocation.		
7.	Disk Management Disk structure, Disk Scheduling Algorithms: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK, Disk Free Space Management, RAID Levels.	06	13
TOTAL		45	100

List of Practical:

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

Text Book(s):

Title	Author/s	Publication
Operating System Principles	Silberschatz A., Galvin P. and Gagne G	Wiley
Modern Operating System	Andrew S. Tanenbaum	Pearson

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation consists of performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, average of the entire practical will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Exam.
- Viva/Oral performance consists of 30 Marks during End Semester Exam.

Course Outcome(s):

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

SEIT2230	OPERATING SYSTEM
CO 1	Understand the basic principles of operating system.
CO 2	Illustrate the concepts of operating systems services and its components.
CO 3	Evaluate the performance of operating system algorithms and achieve a comprehensive understanding of memory management during process execution.
CO 4	Comprehend how an operating system manages file systems, mass storage, and I/O operations.

Mapping of CO with PO

SEIT2230	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2			1	3	2						2
CO 2	2	2		3	2		1					2
CO 3	2	2		2	1		1					1
CO 4	1	2		1	1	2						2

Mapping of CO with PSO

SEIT2230	PSO1	PSO2	PSO3
CO 1			
CO 2	2	1	1
CO 3	1	1	1
CO 4		2	

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction to Operating System	1, 2, 4
2.	Processes and Threads Management	1, 2, 3, 5, 6
3.	Inter Process Communication	2, 3, 4, 5
4.	Deadlock	2, 3, 4, 6
5.	Memory Management	1, 2, 3, 4, 6
6.	File Management	1, 2, 3
7.	Disk Management	1, 2, 3, 4, 5

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT2241

Course Name: Mobile Application Development

Prerequisite Course(s): -- Object Oriented Programming with Java (SEIT2010)

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	00	02	--	--	40	60	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Understand life cycle of an application/activity.
- Learn design of responsive mobile applications.
- Develop mobile application using open-source technologies.

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Create Hello World Application.	02
2.	Create an application to perform addition, subtraction, multiplication, division operation on given two numbers entered by user.	02
3.	Create an application to convert temperature from Fahrenheit to Celsius.	02
4.	Create a login application to validate Email ID and Password. Display Toast Message on successful login or error message if not login.	04
5.	Create an application UI component: Image Button, Toggle button, Progress Bar, Spinner, Date Picker, Time Picker, Seek Bar, Switch, Rating Bar.	08
6.	Create an application that will change color of the screen, based on selected options from the menu.	04
7.	Create an UI such that, one screen have list of all friends. On selecting of any name, next screen should show details of that friend like Name, Image, Interest, Contact details etc.	04
8.	Create an android app to draw red color circle & blue color rectangle using paint & canvas class.	04
9.	Create an app to send SMS and email.	06
10.	Create an application that will play a media file from the memory card.	04
11.	Create application using Google speech API.	06
12.	Create an application to make Insert, Update, and Delete operation on the database.	04
13.	Android Studio Setup for flutter Development	04
14.	Create an application to demonstrate Dialogs & Expansion tile card in a flutter	06
	TOTAL	60

Text Book(s):

Title	Author/s	Publication
Introduction to Android Application Development	Joseph Annuzzi Jr., Lauren Darcey, Shane Conder	Pearson Education
Beginning Android 4 Application Development	Wei Meng Lee	Wrox

Reference Book(s):

Title	Author(s)	Publication
Android Application Development for Dummies, 3 rd Edition	Donn Felker	Wiley Publication

Web Material Link(s):

- <https://nptel.ac.in/courses/106106156/>

Course Evaluation:**Practical:**

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

Course Outcome(s):

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

SEIT2241	MOBILE APPLICATION DEVELOPMENT
CO 1	Develop user friendly mobile applications by implementing different practicals.
CO 2	Understand the concepts of front-end development using various technologies
CO 3	Analyze and implement frameworks, database and design patterns in mobile applications.
CO 4	Create a small but realistic working mobile application using different application programming interface.

Mapping of CO with PO

SEIT2241	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	2	1	1	3	2			1	2	1	1
CO 2	2	1	2	2	3	2			1	1	1	2
CO 3	0	2	3	2	3	2			1	2	2	3
CO 4	3	3	3	2	3	3			3	3	3	3

Mapping of CO with PSO

SEIT2241	PSO1	PSO2	PSO3
CO 1	2	1	1
CO 2	2	3	1
CO 3	3	3	3
CO 4	3	3	3

Level of 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 of Android	1,2,3
2.	Android Application Design and Resource	2,3,4
3.	Exploring User Interface Screen Elements	2,3,4
4.	Designing User Interfaces with Layouts	2,3,6
5.	Working with Widgets & Control	2,4,5,6
6.	Drawing & Working with Animation	3,4,6
7.	Designing Application , Working with Android	2,6

	Manifest file	
8.	Canvas & Paint Class, Multimedia APIs.	1,2,6
9.	Networking APIs, Android Web APIs.	1,2,5,6
10.	Working with Media Controller.	2,3
11.	Working with Speech to Text & Text to Speech.	3,6
12.	Storage APIs, Working with Database.	4,3,6
13.	Cross Platform Mobile Application using flutter.	2,3
14.	Demonstrate UI Components in flutter	2,3,6



THIRD YEAR B. TECH.



P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

**TEACHING & EXAMINATION SCHEME FOR THIRD YEAR B.TECH. COMPUTER SCIENCE & ENGINEERING - DATA SCIENCE
PROGRAMME AY: 2024-25**

Sem	Course Code	Course Title	Course Category	Offered By	Teaching Scheme					Examination Scheme						
					Contact Hours				Credit	Theory		Practical		Tutorial		Total
					Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
5	SEDS3011	Data Science with Python	Major/Core	DS	2	2	0	4	3	40	60	40	60	0	0	200
	SEML3220	R Programming	Major/Core	ML	0	4	0	4	2	0	0	40	60	0	0	100
	SEDS3020	Data Collection and Pre-Processing	Major/Core	DS	3	2	0	5	4	40	60	40	60	0	0	200
	SECE4221	Artificial Intelligence	Major/Core	CE	3	2	0	5	4	40	60	40	60	0	0	200
		Elective-I	Minor		2	2	0	4	3	40	60	40	60	0	0	200
		Language Training Elective Course	AEC	CFLS	3	0	0	3	3	100	0	0	0	0	0	100
		Life Skill Elective Course-I	VAC	CLSC	2	0	0	2	2	100	0	0	0	0	0	100
	SEDS3910	Summer Training	Minor	DS	0	4	0	0	4	0	0	100	0	0	0	100
					Total	27	25							1200		
6	SECE3231	Cloud Computing & Applications	Major/Core	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SEDS3030	Data Warehouse and Data Mining	Major/Core	DS	3	2	0	5	4	40	60	40	60	0	0	200
	SECE4211	Machine Learning	Major/Core	CE	3	2	0	5	4	40	60	40	60	0	0	200
	SEDS3920	Project-I	Minor	DS	0	3	0	3	3	0	0	80	0	0	0	80
		Elective-II	Minor		2	2	0	4	3	40	60	40	60	0	0	200
	TNPC3010	Corporate Grooming & Etiquette	SEC	TNPC	3	0	0	3	3	100	0	0	0	0	0	100
	SEDS3500	MOOC Course / University Elective	SEC	DS	3	0	0	3	3	100	0	0	0	0	0	100
		Life Skill Elective Course-II	VAC	CLSC	2	0	0	2	2	100	0	0	0	0	0	100
					Total	30	26							1180		

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR B. TECH. BATCH : 2024 COMPUTER SCIENCE & ENGINEERING - DATA SCIENCE - ELECTIVE COURSES

Sem	Course Code	Course Title	Course Category	Offered By	Teaching Scheme					Examination Scheme						
					Contact Hours				Credit	Theory		Practical		Tutorial		Total
					Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
5	SEIT3630	Image Processing	Minor	IT	2	2	0	4	3	40	60	40	60	0	0	200
5	SEML3620	Optimization Techniques	Minor	ML	2	2	0	4	3	40	60	40	60	0	0	200
5	SEIT3710	Full Stack Development	Minor	IT	2	2	0	4	3	40	60	40	60	0	0	200
5	SECE3610	Programming with .NET	Minor	CE	2	2	0	4	3	40	60	40	60	0	0	200
6	SEIT4630	Cyber Security	Minor	IT	2	2	0	4	3	40	60	40	60	0	0	200
6	SECE4630	Blockchain Technology	Minor	CE	2	2	0	4	3	40	60	40	60	0	0	200
6	SECE4610	Natural Language Processing	Minor	CE	2	2	0	4	3	40	60	40	60	0	0	200
6	SEML4610	Research Methodology	Minor	ML	2	2	0	4	3	40	60	40	60	0	0	200

**P P Savani University
School of Engineering**

Department of Computer Science & Engineering (DS)

Course Code: SEDS3011

Course Name: Data Science with Python

Prerequisite Course(s): Differential Equations & Statistics (SESH2140)

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the fundamental concepts of Data Science and the basics of Python programming.
- apply Python programming to perform data preprocessing, exploratory data analysis, and data visualization.
- develop Python-based applications to derive meaningful insights from data for informed decision-making.
- write short Python scripts to manipulate datasets and implement common data science workflows.

Course Content:

Module No.	Content	Hours	Weightage in %
8.	Getting started with Python: Basics of Python including data types, operators, variables, expressions, control structures, conditional statements, looping structure, functions, OOP concepts. Python sequence data structures including String, Array, List, Tuple, Set, and Dictionary and associated operations	04	10
9.	Data Science and Descriptive Statistics: Understanding data, its type and data science, Considering the emergence and fundamentals of data science, Data science life cycle, Data analysis (Univariate, bivariate and Multivariate), Data analytics, Data measurement scale, Data descriptive statistics (Measures of central tendency, dispersion/variation, measure of location, Shape and symmetry), Understanding Python's role in data science.	06	20
10.	Exploring Python libraries: Reading from a text file, CSV file, excel file, Streaming, Sampling and uploading data, Managing data with relational database (MySQL), Exploring statistics of data using stats package from SciPy, Numerical computing and working with multidimensional array through NumPy, Data manipulation through Pandas, Basic functionalities of machine learning using Scikit-learn, Extracting components from HTML document through beautiful soup.	06	20
11.	Probabilistic and Inferential Statistics: Random variable, basics of probability, Probability mass function, Probability density function, Cumulative distribution function, Discrete probability distribution (Binomial and Poisson), Continuous probability distributions (Normal and Exponential).	06	20

	Sampling and its various techniques, Estimation, point estimation and interval estimation, Standard normal distribution, Central limit theorem, Hypothesis testing through one sample test.		
12.	Data preparation: Data loading, Data cleaning, dealing with missing data, removing duplicates, Slicing and Dicing, Filtering, and selecting data, Concatenating and transforming, adding new cases and variables, removing data, Sorting and shuffling, Aggregating data, Handling outliers, Data wrangling, Data Normalization.	06	20
13.	Data Visualization: Visualizing data through figure, subplot and its properties, graphs, plots in matplotlib, basics of advanced visualizations with Seaborn.	04	10
TOTAL		30	100

List of Practical:

Sr. No.	Name of Practical	Hours
13.	Introduction to Python Development Environment – Installation using Anaconda and working with IDEs such as IDLE, Jupyter Notebook, PyCharm and Spyder.	02
14.	Python Data Structures – Implementing and manipulating lists, tuples, dictionaries and sets; writing user-defined functions for data handling.	02
15.	String Processing and Collections – Performing string slicing, transformations and operations on sets and arrays using built-in modules.	02
16.	Descriptive Statistics Using Python – Computing basic statistical measures on a real-world dataset using statistics and scipy.stats.	02
17.	Data Analysis with Pandas and NumPy – Creating and manipulating DataFrames and NumPy arrays; filtering, sorting, aggregating and summarizing data.	04
18.	Web Data Handling – Extracting data from HTML pages using BeautifulSoup and storing/retrieving structured data using SQLite database connectivity.	02
19.	Probability Distributions Using Python – Exploring random variables, PMF, PDF, CDF and discrete/continuous distributions with scipy.stats.	02
20.	Statistical Inference – Studying normal distribution, central limit theorem, point and interval estimation, and basic hypothesis testing in Python.	04
21.	Data Cleaning and Preprocessing – Handling missing values, duplicates, outliers and performing indexing/slicing operations on DataFrames.	04
22.	Data Visualization with Matplotlib – Creating basic plots and charts for exploratory data analysis.	02
23.	Advanced Data Visualization with Seaborn – Creating statistical plots and improving interpretability of complex datasets.	02
24.	Exploring Google Data Analytics Tools – Introduction to cloud-based / Google data analytics tools for data exploration and reporting.	02
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Python for data science for dummies	John Paul Mueller, Luca Massaron,	Wiley, 2019

Reference Book(s):

Title	Author(s)	Publication
Programming through Python,	M. T. Savaliya, R. K. Maurya, G. M. Magar,	STAREDU Solutions
Pandas for everyone: Python Data Analysis,	Python Data Analysis, Daniel Y. Chen,	Pearson
Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools,	Davy Cielen, Arno D.B. Meysman, et	Mining

Web Material Link(s):

- <https://www.udemy.com/course/python-for-data-science-and-machine-learning-bootcamp/>
- <https://www.coursera.org/specializations/data-science-python>
- <https://www.w3resource.com/python-exercises/>

Course Evaluation:**Theory:**

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

Practical:

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

Course Outcome(s):

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

SEDS3011	Data Science with Python
CO 1	To understand the fundamental concepts of data science and apply basic Python programming constructs to solve introductory computational problems.
CO 2	To utilize essential Python libraries such as NumPy, Pandas, and Matplotlib for data manipulation, analysis, and visualization.
CO 3	To perform data preprocessing operations such as handling missing values, encoding, transformation, normalization, outlier handling, and feature preparation.
CO 4	To explore statistical concepts including descriptive statistics, probability distributions, and randomness using Python.
CO 5	To apply inferential statistics techniques such as hypothesis testing, estimation, and confidence intervals for data-driven decision making.

Mapping of CO with PO

SEDS3011	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	1	1	2	1	1	1	1	1	2
CO 2	2	3	3	2	3	1	1	2	2	1	2
CO 3	2	3	2	2	3	1	1	2	2	1	2
CO 4	2	3	1	3	1	1	1	1	1	1	2
CO 5	2	3	2	3	2	1	1	1	2	1	2

Mapping of CO with PSO

SEDS3011	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	3	3	2
CO 3	3	3	2
CO 4	2	3	1
CO 5	2	3	1

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Getting started with Python (basics, OOP, sequences, functions)	1, 2, 3
2.	Data Science & Descriptive Statistics	1, 2, 4
3.	Exploring Python Libraries (NumPy, Pandas, MySQL, BeautifulSoup, ML basics)	2, 3, 4, 5
4.	Probabilistic & Inferential Statistics	2, 3, 4, 5
5.	Data Preparation & Preprocessing	3, 4, 5, 6
6.	Data Visualization (Matplotlib, Seaborn)	3, 4, 5, 6

**P P Savani University
School of Engineering**

Department of Computer Science & Engineering (ML & AI)

Course Code: SEML3220
Course Name: R 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	
00	04	00	04	00	00	40	60	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the basics in R programming in terms of constructs, control statements, string functions, etc.
- design and write efficient programs using R, to perform routine and specialized data manipulation/management and analysis tasks.
- identify and use available R packages and associated Open-Source software to meet given scientific objectives.
- handle all aspects of Data analysis (exploring, summarizing, statistical analyzing, visualizing).

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Install R and RStudio, explore the R environment, and configure essential settings.	03
2.	Demonstrate the creation and manipulation of variables and objects in R, including arithmetic operations.	03
3.	Create and manipulate vectors and lists, including operations like sorting and filtering.	04
4.	Demonstrate matrix operations (addition, multiplication) and array manipulations.	05
5.	Create data frames, perform operations like filtering, subsetting, merging, and reshaping.	05
6.	Write programs using decision-making structures and loops for control flow.	04
7.	Demonstrate methods for handling NA and NULL values, and converting data types.	03
8.	Work with dates and times using base functions and specialized packages.	03
9.	Perform basic string manipulations and explore advanced operations with string packages.	04
10.	Create custom functions with parameter handling and lazy evaluation concepts.	04
11.	Read and write data in various formats (CSV, Excel, JSON) and explore data-cleaning techniques.	04
12.	Perform advanced data manipulation tasks like filtering, summarizing, and joining with dplyr().	04
13.	Create basic visualizations (bar chart, histogram, scatter plot) using base R graphics.	05
14.	Design advanced plots using ggplot2, including custom themes and multiple charts on a single layout.	05
15.	Perform basic statistical analyses (mean, median, correlation) and use debugging tools (traceback(), browser()).	04
TOTAL		60

Text Book(s):

Title	Author/s	Publication
R for Everyone: Advanced Analytics and Graphics	Jared P. Lander	Addison-Wesley
The Art of R Programming: A Tour of Statistical Software Design	Norman Matloff	No starch Press

Reference Book(s):

Title	Author(s)	Publication
Beginning R – The Statistical Programming Language	Mark Gardener	Wiley
R Programming for Data Science	Roger D. Peng	Leanpub

Web Material Link(s):

- https://onlinecourses.nptel.ac.in/noc19_ma33/preview
- https://onlinecourses.nptel.ac.in/noc23_ma96/preview

Course Evaluation:**Practical:**

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

Course Outcome(s):

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

SEML3220	R Programming
CO 1	Perform simple arithmetic and statistical operations in r and read data files into r.
CO 2	Apply family of functions for subsetting and basic computations and solve real world problems.
CO 3	Get familiar with r data structures, especially vectors and data frames and perform data manipulation on data frames.
CO 4	Recall the basic principles of r programming students can able to handle all aspects of data analysis.

Mapping of CO with PO

SEML3220	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2	2	3	1	1	1	1	2	1	2
CO 2	3	3	2	3	3	1	1	1	2	3	2	3
CO 3	3	3	3	3	3	2	2	1	3	3	2	3
CO 4	3	3	3	3	3	3	3	2	3	3	3	3

Mapping of CO with PSO

SEML3220	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	1	3	3
CO 3	3	3	3
CO 4	2	2	3

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Install R and RStudio; understand the R Environment	1,2
2.	Introduction to R objects and variables	1,2
3.	Working with vectors and lists	2,3
4.	Matrix and array operations	2,3
5.	Data frames: creation and operations	3,4
6.	Decision making and loops	4
7.	Handling missing and special data	3,4
8.	Date and time in R	2,3,4
9.	String operations and manipulations	3,4
10.	User-defined functions	4,5
11.	Data import and export	2,3,4
12.	Data manipulation with dplyr	3,4,5
13.	Introduction to data visualization	1,2,3
14.	Advanced data visualization with ggplot2	5,6
15.	Statistics and debugging in R	4,5

P P Savani University
School of Engineering

Department of Computer Science & Engineering (DS)

Course Code: SEDS3020

Course Name: Data Collection and Pre-Processing

Prerequisite Course(s): -

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

- Introduces fundamental concepts and methodologies for data collection from diverse sources.
- Imparts knowledge of data quality issues and effective data cleaning techniques.
- Trains students in preprocessing techniques such as transformation, normalization, and data reduction.
- Enables students to design and implement complete data preprocessing pipelines for real-world analytical applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to Data and Collection Methods: Importance of data in data science, types of data (structured, semi-structured, unstructured), data sources (databases, APIs, web scraping, sensors, surveys), ethical and privacy issues in data collection.	05	10
2.	Data Quality and Preprocessing Overview: Dimensions of data quality (accuracy, completeness, consistency, timeliness), common data quality issues, introduction to data wrangling and preprocessing pipeline concepts.	05	10
3.	Handling Missing Data: Types of missing data, techniques for handling missing values (deletion, mean/median/mode imputation, regression, KNN-based imputation), practical examples using tools.	06	15
4.	Noise and Outlier Treatment: Detection and handling of noisy and outlier data, binning, smoothing, regression, statistical and clustering-based outlier detection methods.	05	10
Section II			
Module No.	Content	Hours	Weightage in %
5.	Data Transformation and Normalization: Transformation methods, feature scaling (Min-Max, Z-score, log transformation), encoding categorical data (label, one-hot, ordinal).	06	15
6.	Data Integration: Combining data from multiple sources, schema integration, entity resolution, resolving redundancy and conflicts, practical integration using tools.	05	10
7.	Data Reduction: Need for reduction, feature selection,	06	15

	dimensionality reduction (PCA, SVD), and sampling techniques for large datasets.		
8.	Preprocessing in Practice and Case Studies: Building end-to-end preprocessing pipelines, practical use with tools (Python, OpenRefine, RapidMiner), real-world case studies from healthcare, finance, and social media analytics.	07	15
	TOTAL	45	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Explore Data Sources and Formats: CSV, Excel, JSON, and Database Connections.	02
2.	Load and Inspect Datasets using Python (Pandas) and MS Excel.	02
3.	Perform Data Cleaning and Deduplication using OpenRefine.	02
4.	Handle Missing Values using Mean, Median, Mode, and KNN Imputation Techniques.	02
5.	Detect and Treat Outliers and Noise using Boxplot, Z-score, and IQR Methods.	02
6.	Apply Data Transformation Techniques: Aggregation, Discretization, and Scaling.	02
7.	Perform Normalization using Min-Max, Z-score, and Log Transformations.	02
8.	Encode Categorical Variables using Label, One-Hot, and Ordinal Encoding Methods.	02
9.	Integrate Multiple Datasets (Merging, Joining, Concatenating) using Python.	02
10.	Apply Dimensionality Reduction Techniques using PCA in Scikit-learn.	02
11.	Handle Data Quality Issues: Inconsistencies, Missing Records, and Redundancies.	02
12.	Build a Preprocessing Workflow using RapidMiner.	02
13.	Perform Exploratory Data Analysis (EDA) and Visualization on Cleaned Data.	02
14.	Case Study: Real-world Data Cleaning and Transformation using OpenRefine + Python.	02
15.	Mini Project: Develop an End-to-End Data Preprocessing Pipeline on a Dataset (Kaggle/UCI).	02
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber, Jian Pei	Morgan Kaufmann Publishers

Reference Book(s):

Title	Author/s	Publication
Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython	Wes McKinney	O'Reilly Media
Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow	Aurélien Géron	O'Reilly Media
Introduction to Data Mining	Pang-Ning Tan, Michael Steinbach, Vipin Kumar	Pearson Education

Web Material Link(s)

https://www.coursera.org/learn/data-io-and-preprocessing-with-python-and-sql?utm_source=chatgpt.com

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 consists of 60 marks.

Practical/Tutorial:

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

Course Outcome(s):

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

SEDS3020	Data Collection and Pre-processing
C01	Demonstrate understanding of fundamental concepts of data collection, types of data, and ethical considerations.
C02	Apply preprocessing and cleaning techniques to handle missing, noisy, and inconsistent data using suitable tools.
C03	Perform data transformation, normalization, and encoding for analytical model preparation.
C04	Integrate, reduce, and manage data from multiple sources to enhance data quality and usability.
C05	Design and implement complete preprocessing pipelines on real-world datasets using Python and related tools.

Mapping of CO with PO

SEDS3020	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
C01	2	1			2				1	3	
C02	2	2	2		2				2	3	1
C03	2	2	2	1	2				2	3	1
C04	2	2	2	1	2				2	3	2
C05	2	3	3	2	3	1	1		2	3	2

Mapping of CO with PSO

SEDS3020	PSO 1	PSO 2	PSO 3
C01	2	3	1
C02	2	3	2
C03	2	3	2
C04	2	3	2
C05	3	3	2

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

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

Module No	Content	RBT Level
1.	Introduction to Data and Collection Methods	1,2,3
2.	Data Quality and Preprocessing Overview	2,3
3.	Handling Missing Data	2,3,4
4.	Noise and Outlier Treatment	2,3,4

5.	Data Transformation and Normalization	3,4,5
6.	Data Integration	3, 4, 5
7.	Data Reduction	3, 4, 5
8.	Preprocessing in Practice and Case Studies	3, 4, 5, 6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4221

Course Name: Artificial Intelligence

Prerequisite Course(s): Data Structures (SECE2221)

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

- provide a fundamental understanding of the concepts, history, and scope of Artificial Intelligence.
- enable students to explore the role of AI in shaping future technologies and understand how machines can be designed to exhibit intelligent behaviour.
- develop the ability to design and implement AI-based solutions using appropriate techniques, tools, and algorithms.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	What is AI? What is an AI Technique? The AI Problems and applications, Major areas of Artificial Intelligence, Turing Test	04	10
2.	Problems, State Space Search & Heuristic Search Techniques Defining the Problems as a State Space Search, Production Systems: control & search strategies, Depth first and Breadth first search, Hill Climbing, Best first search, A* algorithm	08	20
3.	Knowledge Representation Issues Representations and Mappings, Approaches to Knowledge Representation, Using Propositional logic and Predicate Logic, Resolution, Semantic network, Frame based knowledge	06	10
4.	Representing Knowledge Using Rules Procedural Versus Declarative Knowledge, Forward Reasoning, Backward Reasoning. Symbolic Reasoning, Under Uncertainty: Introduction to Non-monotonic Reasoning, Logics for Non-monotonic Reasoning	05	10
Section II			
Module No.	Content	Hours	Weightage in %
5.	Uncertain Reasoning and alternatives Probability and Bayes' Theorem, Certainty Factors and Rule-Base Systems, Bayesian Networks, Dempster Shafer Theory, Fuzzy sets, Fuzzy Logic, Fuzzy systems, Hidden Markov model	08	20

6.	Game Theory Introduction to Game playing, The Minimax search procedure, Alpha-Beta procedure, Refinements, Iterative Deepening	05	10
7.	Natural Language Processing Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing, Spell Checking.	04	10
8.	Expert Systems Expert Systems, Architecture of Expert Systems, Roles of Expert Systems, Knowledge Acquisition, Meta Knowledge, Heuristics, Typical Expert Systems – MYCIN, DART, XOON, Expert Systems Shells.	05	10
TOTAL		45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Overview of Artificial Intelligence systems.	02
2.	Write a program to implement BFS (for 8 puzzle problem or Water Jug problem or any AI search problem)	02
3.	Write a program to implement DFS (for 8 puzzle problem or Water Jug problem or any AI search problem)	02
4.	Write a program to Implement A* Algorithm.	04
5.	Explore different python packages which are applicable in AI.	04
6.	Write a program to construct a Bayesian network from given data.	04
7.	Write a program to infer from the Bayesian network.	04
8.	Hidden Markov model implementation using python.	04
9.	Character recognition application using python.	02
10.	NLP application using python.	02
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Artificial Intelligence	By Elaine Rich And Kevin Knight	(2nd Edition) Tata McGraw-Hill

Reference Book(s):

Title	Author/s	Publication
Artificial Intelligence: A Modern Approach	Stuart Russel, Peter Norvig, PHI	

Web Material Link(s)

- <https://nptel.ac.in/courses/106106126/>
- https://www.edureka.co/post-graduate/machine-learning-and-ai?utm_source=google&utm_medium=cpc&utm_campaign=ET-PGPINML-05-Search-AI-High-Intent-Minus-18-24&gclid=EA1aIQobChMI55v6_uC55wIVjx0rCh001wW5EAAYAAEgJcyfD_BwE

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 consists of 60 marks.

Practical/Tutorial:

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

Course Outcome(s):

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

SECE4221	ARTIFICIAL INTELLIGENCE
CO 1	Identify ai limitations, strengths and human centered problems.
CO 2	Employ basic ai principles learning and representation of knowledge.
CO 3	Recognize the importance of ai techniques to design efficient systems.
CO 4	Develop real world solutions based on artificial intelligence.

Mapping of CO with PO

SECE4221	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3			2			1				2
CO 2		3			2				3			3
CO 3			3	2	3			2	2			3
CO 4	2		3	3	3		1			3		3

Mapping of CO with PSO

SECE4221	PSO1	PSO2	PSO3
CO 1	3	2	
CO 2		3	2
CO 3	2	3	
CO 4	3	3	2

Level of Revised Bloom's Taxonomy in Assessment:

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

Module No	Content	RBT Level
1	What is AI?	1, 2, 4
2	Problems, State Space Search & Heuristic Search Techniques	1, 2, 3, 5
3	Knowledge Representation Issues	2, 3, 4, 5
4	Representing Knowledge Using Rules	2, 3, 4
5	Uncertain Reasoning and alternatives	2, 3, 4, 6
6	Game Theory	2, 3, 5
7	Natural Language Processing	2,3,4
8	Expert Systems	1, 2, 3, 4

**P P Savani University
School of Engineering**

Department of Computer Science & Engineering (DS)

Course Code: SEDS3910
Course Name: Summer Training
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	
0	4	0	04	0	0	100	0	0	0	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to,

- have first-hand experience the real time situations in industrial scenario.
- get familiar with engineering applications in industrial spectrum.
- learn to adapt themselves in professional scenario.

Outline of the Summer Training:

Sr. No	Content
1.	Selection of Companies
2.	Company Information collection
3.	Report Writing
4.	Presentation & Question-Answer

Course Evaluation:

Sr. No.	Evaluation criteria	Marks
1	Actual work carried & Report Submission	50
2	Final Presentation & Question-Answer session	50
Total:		100

Course Outcome(s):

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

SEDS3910	SUMMER TRAINING
CO1	Construct company profile by compiling brief history, management structure, products/services offered, key achievements and market performance for the company visited during internship.
CO2	Determine the challenges and future potential for his/her internship organization in particular and the sector in general.
CO3	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
CO4	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
CO5	Analyze the functioning of internship organization and recommend changes for improvement in processes.

Mapping of CO with PO

SEDS3910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1								3	3	3		3
CO 2	3	3	3				2					3

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

Mapping of CO with PSO

SEDS3910	PSO1	PSO2	PSO3
CO 1	1	2	1
CO 2	1	2	2
CO 3	1	2	3
CO 4	1	1	3
CO 5	1	2	3

Report Writing Guidelines

A. Report Format:

1. Title Page (to be provided by the respective supervisor)

The title page of the project shall give the following information in the order listed:

- Full title of the project as approved by the Mentor;
- The full name of the student/Group of students with enrollment number;
- The qualification for which the project is submitted;
- The name of the institution to which the project is submitted;
- The month and year of submission.

2. Project Certification Form

[The form should be duly filled signed by the supervisors.]

3. Acknowledgements

[All persons (e.g. supervisor, technician, friends, and relatives) and organization/authorities who/which have helped in the preparation of the report shall be acknowledged.]

4. Table of Contents/Index with page numbering
5. List of Tables, Figures, Schemes
6. Summary/abstract of the report.
7. Introduction/Objectives of the identified problem
8. Data Analysis and Finding of Solution
9. Application of the identified solution
10. Future Scope of enhancement of the Project and Conclusion
11. "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
12. References(must)
13. Annexures (if any)

B. Guideline for Report Formatting:

- Use A4 size page with 1" margin all sides
- Header should include Project title and footer should contain page number and enrollment numbers
- Chapter Name should be of Cambria font, 20 points, Bold
- Main Heading should be of Cambria font, 14 points, Bold
- Sub Heading should be of Cambria font, 12 points, Bold
- Sub Heading of sub heading should be of Cambria font, 12 points, Bold, Italic
- Paragraph should be of Cambria font, 12 points, no margin at the start of the paragraph
- Line spacing for all content – 1.15, before - 0, after - 0
- No chapter number for references
- Before chapter 1, give page numbers in roman letter

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE3231

Course Name: Cloud Computing & Applications

Prerequisite Course(s): Operating System

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 principles and paradigm of Cloud Computing
- understand the Service Model with reference to Cloud Computing
- appreciate the role of Virtualization Technologies
- gain ability to design and deploy Cloud Infrastructure
- understand cloud security issues and solutions

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to Cloud Computing Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks	05	10
2.	Cloud Architecture, Services and Applications Exploring the Cloud Computing Stack, connecting to the Cloud, Infrastructure as a Service, Platform as a Service, SaaS Vs. PaaS, Using PaaS Application Frameworks, Software as a Service, Cloud Deployment Models, Public vs Private Cloud, Cloud Solutions, Cloud ecosystem, Service management, Identity as a Service, Compliance as a Service	05	10
3.	Virtualization, Abstraction and Cloud Platform Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Hypervisors	07	15
4.	Cloud Infrastructure and Cloud Resource Management Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources. Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards	06	15

Section II			
Module	Content	Hours	Weightage in %
5.	Cloud Security Security Overview, Cloud Security Challenges and Risks, Software-as-a- Service Security, Cloud computing security architecture: Architectural Considerations, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security, Identity and Presence, Identity Management and Access Control, Autonomic Security Establishing Trusted Cloud computing, Secure Execution Environments and Communications, , Identity Management and Access control Identity management, Access control, Autonomic Security Storage Area Networks, Disaster Recovery in Clouds	06	15
6.	AWS Programming, Management Console and Storage Basic Understanding APIs - AWS programming interfaces, Web services, AWS URL naming, Matching interfaces and services, Elastic block store - Simple storage service, Define the AWS Cloud and its value proposition, Identify aspects of AWS Cloud economic, List the different cloud architecture design principles, Security and Compliance, Define the AWS shared responsibility model, Define AWS Cloud security and compliance concepts, Identify AWS access management capabilities, Identify resources for security support	09	20
7.	AWS Technology, Billing and Pricing Define methods of deploying and operating in the AWS Cloud, Define the AWS global infrastructure, Identify the core AWS services, identify resources for technology support, Compare and contrast the various pricing models for AWS, Recognize the various account structures in relation to AWS billing and pricing, Identify resources available for billing support	07	15
TOTAL		45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1	Cloud Concepts Overview	02
2	Cloud Economics and Billing	02
3	Cloud Global Infrastructure Overview	02
4	Explore Cloud Security Fundamentals	04
5	Networking and Content Delivery	04
6	Explore Compute Services (IAAS)	04
7	Explore Storage Services	04
8	Explore Database Services	04
9	Cloud Architecting	02
10	Auto Scaling and Monitoring	02
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Cloud Computing Bible	Barrie Sosinsky	John Wiley & Sons

Reference Book(s):

Title	Author/s	Publication
Amazon Web Services for Dummies	Bernard Golden	Dummies
Amazon Web Services in Action	Michael Wittig and Andreas Wittig	Dreamtech Press
Building Applications in the Cloud:	Christopher M. Moyer	Pearson Addison-

Concepts, Patterns and Projects		Wesley Professional
Cloud Computing Design Patterns	Thomas Erl	Prentice Hall

Web Material Link(s):

- <http://www.cloudbus.org/>
- <https://aws.amazon.com/>
- <http://aws.amazon.com/documentation/>
- <http://docs.aws.amazon.com/IAM/latest/UserGuide/getting-started.html>

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 out of 30 marks.
- Faculty Evaluation consists of 10 marks as per guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks Exam.

Practical:

- Continuous Evaluation Consist of Performance of Practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal Viva consists of 10 marks.
- Practical performance/quiz/test of 15 marks during End Semester Exam.
- Viva/Oral performance of 15 marks during End Semester Exam.

Course Outcome(s):

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

SECE3231	CLOUD COMPUTING & APPLICATIONS
CO 1	Describe various cloud computing features, challenges through various models and services.
CO 2	Apply different approaches of cloud computing system for efficient data storage with minimal cost.
CO 3	Identify various management related services of aws.
CO 4	Distinguish various security and compliance related issues with aws.
CO 5	Deploy applications over commercial cloud computing infrastructures such as amazon.

Mapping of CO with PO

SECE3231	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2			3				1			2
CO 2		3		2	2				2			3
CO 3	2			3							1	3
CO 4	2			2	1							2

Mapping of CO with PSO

SECE3231	PSO1	PSO2	PSO3
CO 1	3		2
CO 2	1	3	
CO 3	2		3
CO 4		2	3

Level of Revised Bloom's Taxonomy in Assessment:

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

Module No	Content	RBT Level
1	Introduction to Cloud Computing	1, 2
2	Cloud Architecture, Services and Applications	1, 2
3	Virtualization, Abstraction and Cloud Platform	1, 2, 3
4	Cloud Infrastructure and Cloud Resource Management	1, 2, 3
5	Cloud Security	1, 2, 3
6	AWS Programming, Management Console and Storage	1, 2, 3, 4
7	AWS Technology, Billing and Pricing	3, 4, 5, 6

P P Savani University
School of Engineering

Department of Computer Science Engineering (DS)

Course Code: SEDS3030

Course Name: Data Warehouse and Data Mining

Prerequisite Course(s): -

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
3	2	0	4	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

- To understand the concepts of data warehousing and its architecture.
- To learn data preprocessing, OLAP operations, and data cube construction.
- To acquire knowledge of various data mining tasks and algorithms.
- To explore applications of data mining in real-world domains.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to Data Warehousing Data warehouse characteristics, Differences between OLTP and OLAP, Data warehouse architecture and components	08	15
2.	Data Warehousing Design Data cube and schema types: star, snowflake, fact constellation, Measures and fact tables, OLAP operations: roll-up, drill-down, slice, dice, pivot	06	20
3.	ETL and Data Preprocessing Data extraction, cleaning, transformation, and loading (ETL), Data integration and redundancy handling, Data reduction techniques	06	10
4.	Data Cube Technology Efficient computation of data cubes, multi-dimensional data models, Indexing OLAP data structures	08	15
Section II			
Module No.	Content	Hours	Weightage in %
5.	Introduction to Data Mining Data mining functionalities, KDD process, Applications of data mining in business, healthcare, social media	06	10
6.	Association Rule Mining Basic concepts, Apriori algorithm, FP-Growth algorithm - Evaluation of association rules (support, confidence, lift)	03	10
7.	Classification and Prediction Decision tree induction (ID3, C4.5), Bayesian classification, k-Nearest Neighbour (KNN) - Evaluation metrics: precision, recall, F1 score	04	10
8.	Clustering Partitioning methods: k-Means, k-Medoids, Hierarchical	04	10

	clustering, Density-based clustering (DBSCAN)		
	TOTAL	45	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Design of star and snowflake schemas for sample data.	02
2.	Perform OLAP queries (roll-up, drill-down, slice, dice).	02
3.	Construction of data cubes.	02
4.	Implement Apriori algorithm for association rules.	02
5.	Implement FP-Growth for frequent itemset mining.	02
6.	Apply decision tree classifier (ID3/CART) on dataset.	02
7.	Apply KNN classifier on dataset.	02
8.	Implement k-Means clustering.	02
9.	Introduction to data mining tool: Weka	02
10.	Solve classification problems using WEKA	04
11.	Solve clustering problems using WEKA	04
12.	Mini-project: Building a small data warehouse and applying mining techniques.	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber, Jian Pei	Elsevier

Reference Book(s):

Title	Author/s	Publication
Data Mining	Arun K. Pujari	University Press
Data Warehousing Fundamentals	Paulraj Ponnian	John Willey & Sons
Introduction to Data Mining	Tan, Steinbach, Karpatne, Kumar	Addison-Wesley

Web Material Link(s)

- <https://www.cs.waikato.ac.nz/ml/weka>
- <https://ocw.mit.edu/courses/sloan-school-of-management/15-062-data-mining-spring-2003/>
- https://www.tutorialspoint.com/dwh/dwh_data_warehousing.htm

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 consists of 60 marks.

Practical/Tutorial:

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

Course Outcome(s):

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

SEDS3030	Data Warehouse and Data Mining
C01	Describe data warehouse architecture and OLAP operations.
C02	Apply preprocessing and integration techniques for preparing data warehouses.
C03	Implement basic data mining algorithms for classification, clustering, and association.
C04	Analyze data using OLAP and data mining techniques for decision making.
C05	Design simple data warehouse and data mining solutions for real-world problems.

Mapping of CO with PO

SEDS3030	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	1	2	1				1	1	2	1
C02	2	3	2	2	1				1	1	2	2
C03	2	3	3	3	2				1	1	2	2
C04	2	3	3	3	2				2	1	3	3
C05	2	2	3	3	3				2	2	3	3

Mapping of CO with PSO

SEDS3030	PSO 1	PSO 2	PSO 3
C01	3	2	1
C02	3	3	2
C03	2	3	3
C04	2	3	3
C05	2	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 Data Warehousing	1, 2
2.	Data Warehousing Design	2, 3, 4, 6
3.	ETL and Data Preprocessing	1, 2, 3
4.	Data Cube Technology	2, 3, 4
5.	Introduction to Data Mining	1, 2, 5
6.	Association Rule Mining	2, 3, 4, 5
7.	Classification and Prediction	2, 3, 4, 5
8.	Clustering	2, 3, 4, 5

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4211

Course Name: Machine Learning

Prerequisite Course(s): Differential Equations & Statistics

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	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Master the concepts of supervised and unsupervised learning, recommendation engine, and time series modeling.
- Implement models such as support vector machines, kernel SVM, naive Bayes, decision tree classifier, random forest classifier, logistic regression, K-means clustering and more in Python.
- Comprehend the theoretical concepts and how they relate to the practical aspects of Machine Learning.

Course Content:

Section I			
Module	Content	Hours	Weightage in %
1.	Introduction to Artificial Intelligence and Machine Learning Learning Problems, designing a learning system, Issues with machine learning. Concept Learning, Version Spaces and Candidate Eliminations, Inductive bias.	06	10
2.	Supervised learning Decision Tree Representation, Appropriate problems for Decision tree learning, Algorithm, Hypothesis space search in Decision tree learning, inductive bias in Decision tree learning, Issues in Decision tree learning, Radial Bases, Functions, Case Based Reasoning.	08	20
3.	Artificial Neural networks and genetic algorithms Neural Network Representation, Appropriate problems for Neural Network Learning, Perceptrons, Multilayer Networks and Back Propagation Algorithms Remarks on Back Propagation Algorithms. Case Study: face Recognition.	09	20
Section II			
Module	Content	Hours	Weightage in %

4.	Bayesian Learning Bayes Theorem, Bayes Theorem and Concept Learning, Maximum Likelihood and Least squared Error Hypothesis, Maximum likelihood hypothesis for Predicting probabilities, Minimum Description Length, Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naive Bayes Classifier. Case Study: Learning to classify text.	09	20
5.	Unsupervised learning Unsupervised learning, Applications, challenges, K-means, K- Nearest Neighbour Learning Locally Weighted Regression, SVM, Apriori Algorithm, EM Algorithm.	07	20
6.	Overview Typical application areas, such as Recommender System.	06	10
TOTAL		45	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction	02
2.	Classifying with distance measures	02
3.	Constructing Decision trees	02
4.	Classification using Decision Trees	02
5.	K-means	02
6.	Classification with k-Nearest Neighbours	02
7.	Random Forest	02
8.	Support vector machines	02
9.	Expectation Maximization	02
10.	Page Rank	04
11.	Naive Bayes Classification	04
12.	CART	04
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Machine Learning	Tom M Mitchell	McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Pattern Recognition and Machine Learning	Christopher Bishop	Springer-Verlag New York Inc.
Real-World Machine Learning	Henrik Brink, Joseph Richards, Mark Fetherolf	DreamTech
Machine Learning in Action	Peter Harrington	DreamTech

Web links:

- <https://nptel.ac.in/courses/106/105/106105152/>
- [https://in.mathworks.com/campaigns/offers/machine-learning-with-
t1ab.html?gclid=EAIaIQobChMIrv2dqpOh5wIVkoiPCh0t9g8CEAAYASAAEgKl-
fD BwE&ef_id=EAIaIQobChMIrv2dqpOh5wIVkoiPCh0t9g8CEAAYASAAEgKl-](https://in.mathworks.com/campaigns/offers/machine-learning-with-
t1ab.html?gclid=EAIaIQobChMIrv2dqpOh5wIVkoiPCh0t9g8CEAAYASAAEgKl-
fD BwE&ef_id=EAIaIQobChMIrv2dqpOh5wIVkoiPCh0t9g8CEAAYASAAEgKl-)

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- https://wgu.org/programs/datascience/?utm_source=datawrkz&utm_medium=search&utm_campaign=datascience&gclid=EA!a!QobChMir_TK5ZO!h5wIVzQorCh0YdQBvEAAAYASAAEgLb5PD_BwE

Course Evaluation:

Theory

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, and average at 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 performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks. Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

SECE4211	MACHINE LEARNING
CO 1	Recognize basic problem with hypothesis and version spaces.
CO 2	Understand and apply the features of machine learning on real world problems.
CO 3	Identify and utilize various algorithms of supervised and unsupervised learning.
CO 4	Recall the concept of neural networks, Bayesian analysis from probability models and methods.
CO 5	Illustrate fundamental concepts of genetic algorithm.

Mapping of CO with PO

SECE4211	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		2		1								1
CO 2			2	2	3							2
CO 3		2		1	2				1			1
CO 4	1	1		1	1					1		1
CO 5												

Mapping of CO with PSO

SECE4211	PSO1	PSO2	PSO3
CO 1		3	
CO 2	2	1	2
CO 3	1	1	
CO 4	1		1
CO 5	1		1

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1	Introduction to Artificial Intelligence and Machine Learning	1, 2
2	Supervised learning	1, 2, 3, 5
3	Artificial Neural networks and genetic algorithms	2, 4, 5
4	Bayesian Learning	2, 3, 4
5	Unsupervised learning	2, 3, 4
6	Overview	2, 3, 5

**P P Savani University
School of Engineering**

Department of Computer Science & Engineering (DS)

Course Code: SEDS3920

Course Name: Project-I

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	
0	3	-	3	-	-	80	-	-	-	80

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the current trend or technology.
- aware of future technologies.
- try to learn new technologies and apply them as much as possible.

Outline of the Project-I

S. No.	Task	Weightage in %
1.	Group Formation	-
2.	Title Approval and Mentor Allocation	-
3.	First Progress Report	5
4.	First Review	10
5.	Second Progress Report	5
6.	Third Progress Report	5
7.	Second Review	10
8.	Fourth Progress Report	5
9.	Fifth Progress report	10
10.	Final Report Evaluation	25
11.	Final Presentation	25
TOTAL		100

Detailed Guideline(s):

Sr. No.	Content	Weightage in %
1.	Group Formation: Group formation requires a minimum of one member and allows for a maximum of three members per group.	-
2.	Title Approval and Mentor Allocation: In the initial week of the semester, students are tasked with submitting a preliminary review of their project with a suitable title. This submission includes a comprehensive synopsis and outline, accompanied by a discussion on the anticipated project outcomes. This early review acts as the foundation for the project, laying the groundwork and establishing the direction for subsequent work. Additionally, during this stage, mentors are allocated to provide guidance and support throughout the project development process.	-
3.	First Progress Report: Within the initial weeks of commencing the project, students are required to submit a detailed report outlining their progress, achievements, and any challenges encountered.	5
4.	First Review:	10

	This report serves as an early checkpoint, allowing for an assessment of whether the project is on track with the proposed timeline and objectives. Students should highlight key accomplishments, provide insights into the methodologies employed, and address any deviations from the initial plan.	
5.	Second Progress Report: This report explores into the details of the progress made since the First Progress Report and First Review, offering a comprehensive overview of achievements, setbacks, and adaptations to the project plan. Students should reflect on the effectiveness of their methodologies, address any unforeseen obstacles, and demonstrate a proactive approach to overcoming challenges.	5
6.	Third Progress Report: At this stage, students provide a comprehensive update on the continuous evolution of their projects, demonstrating the resilience and adaptability required for successful project development. In the Third Progress Report, students delve into the nuances of their progress since the Second Progress Report, showcasing not only achievements but also a reflective analysis of the journey thus far.	5
7.	Second Review: During this stage, internal evaluators and expert panels engage in a comprehensive assessment of the project's overall development and achievements. The Second Review provides students with an opportunity to present their progress, methodologies, and outcomes to a panel of experts.	10
8.	Fourth Progress Report: In this report, students provide an updated justification of their progress, building on the insights gained from the Second Review. The Fourth Progress Report encapsulates the continuous refinement and optimization of project strategies. Students delve into the accomplishments achieved post-Second Review, addressing any recommendations made by external evaluators.	5
9.	Fifth Progress report: At this stage, students present a comprehensive overview of the project's evolution, encapsulating the lessons learned, achievements attained, and challenges overcome. The Fifth Progress Report serves as a reflection on the entire project lifecycle, providing insights into the iterative process of development. The students should submit the final report to the mentor which will be further sent for evaluation.	10
10.	Final Report Evaluation & Final Presentation: During this phase, students present their comprehensive Final Report, encapsulating the entire project lifecycle, methodologies employed, outcomes achieved, and lessons learned. Final Report Evaluation: The Final Report undergoes a thorough evaluation by faculty members and external experts. This evaluation scrutinizes the depth of content, adherence to project objectives, and the overall quality of documentation. Final Presentation: Students present their projects to a panel of faculty members, peers, and potentially external stakeholders. This presentation offers an opportunity to showcase the project's significance, innovation, and impact.	50
TOTAL		100

Course Evaluation:

S. No.	Evaluation criteria	Marks
1.	First Progress Report	50
2.	First Review	100
3.	Second Progress Report	50
4.	Third Progress Report	50
5.	Second Review	100

6.	Fourth Progress Report	50
7.	Fifth Progress report	100
8.	Final Report Evaluation	250
9.	Final Presentation	250
	TOTAL	1000

The entire evaluation will be converted equivalent to 100 Marks.

Course Outcome(s):

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

SEDS3920	PROJECT-I
CO 1	Analyze user requirements and implement innovative ideas for social and environmental benefits.
CO 2	Apply new technologies and design techniques concerned for devising a solution for a problem statement.
CO 3	Apply project management skills like task scheduling, teamwork, working in confine deadlines etc., for successfully development of the project.
CO 4	Prepare reports and presentations to communicate technical information.

Mapping of CO with PO

SEDS3920	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	3	1	3	2	3			2	2
CO 2	3	1	1	2	3		2	3		1	2	3
CO 3			1					1	3	1	1	1
CO 4			1	1		2	1	1	1	3		3

Mapping of CO with PSO

SEDS3920	PSO1	PSO2	PSO3
CO 1	2	3	2
CO 2	3	3	2
CO 3	1	2	3
CO 4	1	2	3

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT3630
Course Name: Image Processing
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	02	00	03	40	60	40	60	0	0	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to,

- understand the fundamentals of image processing.
- Apply various processes on the image for image understanding.
- Design and implement algorithms that perform basic image processing

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to Digital Image Fundamentals Fundamentals steps in digital Image Fundamentals, Human visual system, Image as a 2D data, Image representation – Grayscale and Color images, image sampling and quantization, Some basic relationships between pixels.	04	10
2.	Image Enhancements In spatial domain: Basic gray level transformations, Histogram processing, Using arithmetic/Logic operations, smoothing spatial filters, Sharpening spatial filters. In Frequency domain: Introduction to the Fourier transform and frequency domain concepts, smoothing frequency-domain filters, Sharpening frequency domain filters.	07	15
3.	Image Restoration and Reconstruction Image Degradation Models: Noise and Blur. Noise Removal Techniques: Mean, Median, and Adaptive Filters. Inverse Filtering and Wiener Filtering.	04	10
Section II			
Module No.	Content	Hours	Weightage in %
4.	Color Image Processing Basics of color Models (RGB, CMY, HIS), Pseudocolor image processing.	02	12
5.	Image Compression Introduction, coding Redundancy, Inter-pixel redundancy, image compression methods, Lossy and Lossless compression, Huffman coding, Arithmetic coding, LZW coding, IPEG compression standard.	03	10
6.	Image Segmentation point, line and edge detection, Thresholding, Regions Based segmentation, Edge linking and boundary detection, Hough transform.	03	10

7.	Morphological Image Processing Erosion, dilation, opening, closing, Basic Morphological Algorithms: hole filling, connected components, thinning, skeleton.	03	08
8.	Case Studies Object representation, description, and recognition, Application of Image processing in various field.	04	10
TOTAL		30	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to Image Processing Toolbox.	04
2.	Read the image and perform 1. RGB to Gray image 2. RGB to Indexed image and 3. Gray to Indexed image	04
3.	Read an 8bit image and then apply different image enhancement techniques: (a) Brightness improvement (b) Brightness reduction (c) Thresholding (d) Negative of an image (e) Log transformation (f) Power Law transformation.	04
4.	Implement different interpolation techniques using MATLAB.	04
5.	Read an image, plot its histogram then do histogram equalization and comment about the result.	04
6.	(a) Implement Gray level slicing (intensity level slicing) in to read cameraman image. (b) Read an 8bit image and to see the effect of each bit on the image. (c) Read an image and to extract 8 different planes i.e. 'bit plane slicing.'	06
7.	Implement various Smoothing spatial filter	04
8.	Read an image and apply (1) Gaussian 3x3 mask for blurring (2) High pass filter mask with different masks (3) Laplacian operator with center value positive and negative (4) High boost filtering.	06
9.	Write a program to implement various low and high pass filters in the frequency domain.	04
10.	Write a program for erosion and dilation, opening & closing using inbuilt and without inbuilt functions.	04
11.	Implement and study the effect of Different Mask (Sobel, Prewitt, and Roberts)	04
12.	Implement various noise models and their Histogram	04
13.	Implement inverse filter and Wiener filter over image and comment on them	04
14.	Implement Image compression using DCT Transform	04
TOTAL		60

Text Book(s):

Title	Author/s	Publication
Digital Image Processing	Rafael C. Gonzalez, Richard E. Woods	Pearson Education
Fundamentals Digital Image Processing	ITL Education Solutions Limited	Prentice Hall India Learning

Reference Book(s):

Title	Author(s)	Publication
Image Processing, Analysis and Machine Vision	Milan Sonka, Vaclav Hlavac, Roger Boyle	CL Engineering
Digital Image Processing	William K. Pratt	John Wiley & Sons

Web Material Link(s):

- <https://nptel.ac.in/courses/106105032/>

Course Evaluation:**Theory:**

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

Practical:

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

Course Outcome(s):

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

SEIT3630	IMAGE PROCESSING
CO 1	Immediate understanding of the concept of digital image.
CO 2	Understand the basic image enhancement techniques in spatial & frequency domains
CO 3	Apply image filtering to solve image restoration, reconstruction, and compression.
CO 4	Create image segmentation and devise object recognition with the help of different case studies.

Mapping of CO with PO

SEIT3630	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1		2							
CO 2	3	3	2	2	2							
CO 3	3	3	3	3	3							
CO 4	3	3	3	3	3	1	1	2	1	2	2	3

Mapping of CO with PSO

SEIT3630	PSO1	PSO2	PSO3
CO 1		2	
CO 2		3	
CO 3		3	2
CO 4	3	3	3

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction to Digital Image Fundamentals	1,2
2.	Image Enhancements	1,2,4
3.	Image Restoration and Reconstruction	2,3,5
4.	Color Image Processing	2,5
5.	Image Compression	2,5
6.	Image Segmentation	4,5

7.	Morphological Image Processing	2,4,5
8.	Case Studies	3,6

**P P Savani University
School of Engineering**

Department of Computer Science & Engineering (ML & AI)

Course Code: SEM13620

Course Name: Optimization Techniques

Prerequisite Course (s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to,

- Cast engineering minima/maxima problems into optimization framework.
- Learn efficient computational procedures to solve optimization problems.
- Use Matlab to implement important optimization methods.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Mathematical Preliminaries Linear algebra: Matrices, Vectors, Eigen analysis, Elements of probability theory, Elementary multivariable calculus	08	25
2.	Linear Programming Introduction to linear programming model, Simplex method, Duality, Karmarkar's method, transportation and assignment problems	07	25
Section II			
3.	Unconstrained Optimization One-dimensional search methods, Gradient-based methods, Conjugate direction and quasi-Newton methods	04	15
4.	Constrained Optimization Lagrange theorem, First-Order Necessary Conditions (FONC), Second-Order Necessary Conditions (SONC), and Second-Order Sufficient Conditions (SOSC)	04	15
5.	Non-Linear problems Non-linear constrained optimization models, Karush-Kuhn-Tucker (KKT) condition, Projection methods	07	20
TOTAL		30	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Matrix operations in Matlab	02
2.	Differentiation of a vector and matrix in Matlab	02
3.	Integration of a vector and matrix in Matlab	02
4.	Simplex algorithm in Matlab	04
5.	Implementation of Newton's method in Matlab	04

6.	Implementation of Secant method in Matlab	04
7.	Implementation of Lagrange multiplier method in Matlab	04
8.	Implementation of KKT theorem in Matlab	04
9.	Implementation of BFGS method in Matlab	04
	TOTAL	30

Reference Book(s):

Title	Author/s	Publication
An introduction to Optimization	Edwin P K Chong, Stainslaw Zak	Wiley Publication
Nonlinear Programming	Dimitri Bertsekas	Athena Scientific

Course Evaluation:

Theory:

- Internal Evaluation component consists of 30 marks containing two internal exams of 30 marks. Average of the same will be considered for final marking.
- End Semester Examination consists of 60 marks.
- Faculty evaluation component will be cumulative of assignments, exercises, classroom behaviors consisting of 10 marks.

Practical

- Continuous Evaluation will be cumulative of practical performances, activities, presentations, viva and submissions consisting of 20 marks.
- Practical performance/quiz/drawing/test/submission of 30 marks during End Semester Exam.

Course Outcome(s):

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

SEML3620	OPTIMIZATION TECHNIQUES
CO 1	Recall the theoretical foundations of various issues related to linear programming modeling to formulate real world problems as a l p model.
CO 2	Identify appropriate optimization methods to solve complex problems involved in various industries.
CO 3	Explain the theoretical workings of the graphical, simplex and analytical methods for making effective decisions on variables so as to optimize the objective function.
CO 4	Find the appropriate algorithm for allocation of resources to optimize the process of assignment.

Mapping of CO with PO

SEML3620	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2	2	2						2
CO 2	3	3	3	2	3	2						2
CO 3	3	3	3	3	3	3						2
CO 4	3	3	3	3	3	3						2

Mapping of CO with PSO

SEML3620	PSO1	PSO2	PSO3
CO 1	3	3	2
CO 2	3	3	2
CO 3	3	3	2
CO 4	3	3	2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1	Mathematical preliminaries	1, 2,3,4
2	Linear Programming	3,4,5
3	Unconstrained optimization	2,3,4
4	Constrained optimization	3,4,5
5	Non-Linear Problems	2,3,4, 6

**P P Savani University
School of Engineering**

Department of Information Technology

Course Code: SEIT3710
Course Name: Full Stack Development
Prerequisite Course (s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Develop Interactive web applications with both front-end and back-end technologies.
- Understanding of various aspects of web technologies with various data operation with MongoDB.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	HTML5 Introduction to HTML, Browsers and HTML, Editor's Offline and Online, Tags, Attribute and Elements Doctype Element, Comments, Headings, Paragraphs and Formatting Text, Lists and Links, Images and Tables.	03	10
2.	CSS3 Introduction CSS, Applying CSS to HTML, Selectors, Properties and Values, CSS Colors and Backgrounds, CSS Box Model, CSS Margins, Padding, and Borders, CSS Text and Font Properties, CSS General Topics	03	15
3.	JavaScript and jquery Introduction to JavaScript, Applying JavaScript (internal and external), Understanding JS Syntax, Introduction to Document and Window Object, Variables and Operators, Data Types and Num Type Conversion, Math and String Manipulation, Objects and Arrays, Date and Time, Conditional Statements, Switch Case, Looping in JS, Functions, JavaScript Objects, JavaScript Forms, JavaScript HTML DOM, JavaScript BOM, JavaScript Type Conversion, JavaScript RegExp, JavaScript Errors, JavaScript Debugging, JavaScript Hoisting, JavaScript Strict Mod, Basics of jQuery, jQuery syntaxes, jQuery selectors, events, effects, Access/Manipulate web browser elements using jQuery, jQuery HTML, jQuery Traversing, jQuery AJAX & Misc.	09	20
SECTION II			
Module No.	Content	Hours	Weightage in %

4.	Frontend with ReactJS Introduction, Templating using JSX, Components, State and Props, Lifecycle of Components, Rendering List and Portals, Error Handling, Routers, Redux and Redux Saga, Immutable.js, Service Side Rendering, Unit Testing, Webpack	06	20
5.	Backend with NodeJS Introduction to Node.js, Node Package Manager, REPL Terminal, Node.js Webserver – Server and Clients, Creating a simple server, Rendering HTML, Rendering JSON Data, Routing	06	15
6.	MongoDB SQL and NoSql Concepts, Create and Manage MongoDB, Migration of Data into MongoDB, MongoDB with PHP, MongoDB with NodeJS, Services Offered by MongoDB	03	10
TOTAL		30	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Design Wireframes for your project based on Web Design Principles.	4
2.	Formatting web pages with CSS (Inline CSS, Document level CSS and External CSS.	4
3.	Browser interaction and form validations (Web browser environments, forms and validations, image sliders) [Image slider plugins of jQuery, Client-side validation of Registration & Login	4
4.	Design web application using Bootstrap principles.	4
5.	Make interactive web pages with reactJS concepts.	2
6.	Design web application with back end of NodeJS.	2
7.	Implement basic data operations in web application with MongoDB.	2
8.	Develop Complete Web application as a mini project.	08
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Black Book, Web Technologies,	Kogent Learning Solutions Inc	Dreamtech Press
Full Stack Web Development For Beginners	Riaz Ahmed	Atlantic publisher

Reference Book(s):

Title	Author/s	Publication
Black Book, HTML 5	DT Editorial Services	Dreamtech Press
Developing Web Applications	Ralph Moseley and M. T. Savaliya	Wiley-India
jQuery Cookbook	Cody Lindley	O'Reilly Media
Head First jQuery - A Brain-Friendly Guide	Ryan Benedetti, Ronan Cranley	O'Reilly Media

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SEIT3710	Full Stack Development
CO 1	Understand and compare the fundamentals of Web hosting and domain name services.
CO 2	Understand various non-browser specific web design principles.
CO 3	Understand the need and be able to develop HTML/XHTML and CSS pages with valid structure as well as content.
CO 4	Understand and be able to develop JavaScript/jQuery code to access the DOM structure of web document and object properties.
CO 5	Develop dynamic web pages with usage of server-side scripting NodeJS and MongoDB.

Mapping of CO with PO

SEIT3710	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	2	2	3	2	2				1	1
CO 2	1	2	2	2	2	2	1				1	1
CO 3	1	2	2	2	1	2	2					2
CO 4	2	2	2	1	2	2	1				1	1
CO 5	1	1	2	2	2	2	2				1	1

Mapping of CO with PSO

SEIT3710	PSO1	PSO2	PSO3
CO 1	2	1	2
CO 2	2		
CO 3	1	2	2
CO 4	2	2	1
CO 5	2	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	HTML5	1,2,3,6
2	CSS3	2,3,6
3	JavaScript and jQuery	1,3,6
4	ReactJS	1,3,6
5	NodeJS	1,2,3,5

6	Database Connectivity with MongoDB	2,4,5
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**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE3610

Course Name: Programming with .NET

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	
2	2	0	3	40	60	40	60	0	0	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understanding .NET Framework and Programming Concepts
- develop Object-Oriented and Event-Driven Applications
- implement Database Connectivity and State Management

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction To .Net Technology: Introduction to .NET Framework Architecture, Program Execution in .NET, CLR structure, CTS, CLS, CLR, Cross language Integration, Garbage Collection, DLL Hell, Assemblies, Name spaces, Versioning and deployment, Side by Side Execution, Debugging	05	20
2.	Basics of C# language using Console Application: Namespace, Variables, Data Types, Operators, Type Conversion, Decision making statements, Conditional Loops, Arrays, String Builder	03	08
3.	Object Oriented Programming in C#.NET: Language Features and Creating .NET Projects, Creating Class, declaring variables and methods, Access Modifiers, Constructors, Access Modifier, Inheritance, Interface, method overloading, method overriding, Anonymous method, Debugging and Error Handling, Exception Handling	07	22
Section II			
Module No.	Content	Hours	Weightage in %
4.	Windows Forms and Controls: Basics of Windows Forms, Properties and Events of Windows Forms, Properties and Events of Controls, Button, Label, TextBox, NumericUpDown, Checkbox, Radio Button, DateTimePicker, Group Box, ListBox, ListView, ComboBox, TabControl, PictureBox, ProgressBar, ToolTips, RichTextbox, Timer, DataGridView, etc., Execution flow, Event Driven programming	06	22
5.	Web Application using ASP .NET & ADO.NET: Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NET Validation Controls, Using the Simple Validations, Overview of ADO.Net framework, working with SQL server database, Managed Provider, Dataset, working with data source, Connected and	06	20

	disconnected architecture, Binding data with DataGrid		
6.	Routing & State Management: Preserving State in Web Applications and Page-Level State, Using Cookies to Preserve State, ASP.NET Session State, Storing Objects in Session State, Configuring Session State, Setting Up an Out-of-Process State Server, Storing Session State in SQL Server.	03	08
TOTAL		30	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Create a console application to demonstrate the use of CLR and CTS.	02
2.	Write a console application to demonstrate data types, variables, and operators.	02
3.	Create a program to sort an array of integers and find the largest/smallest element.	02
4.	Demonstrate inheritance, interface implementation, and method overloading/overriding using C#.	02
5.	Create a C# program that implements try-catch-finally blocks for exception handling.	02
6.	Create a Windows Forms application with controls like TextBox, Button, and Label.	02
7.	Build a form with controls like ListBox, ComboBox, and DateTimePicker.	02
8.	Create a form to display data using a DataGridView control.	04
9.	Design a web page with HTML and ASP.NET server controls with validation.	04
10.	Create a database in SQL Server and perform CRUD operations using ADO.NET.	04
11.	Bind data to a DataGrid in an ASP.NET application.	02
12.	Configure session state using SQL Server and demonstrate its usage in an ASP.NET application.	02
TOTAL		30

Text Book(s):

Title	Author/s	Publication
Programming in C# and .NET Platform	Andrew Troelsen	Apress
C# 10 and .NET 6 - Modern Cross-Platform Development	Mark J. Price	Packt Publishing

Reference Book(s):

Title	Author(s)	Publication
C# in Depth	Jon Skeet	Manning Publications
ASP.NET Core in Action	Andrew Lock	Manning Publications
Professional ASP.NET MVC and Core	Jon Galloway, Brad Wilson, K. Scott Allen, and David Matson	Wrox

Web Material Link(s):

- <https://www.udemy.com/course/masteraspdotnetbasics/?couponCode=NEWYEARCAREER>
- <https://www.youtube.com/watch?v=hE05SqxPs9E>
- http://www.tutorialspoint.com/vb.net/vb.net_basic_controls.htm
- <http://www.freelearn110.com/visualbasic/level1/tutorials.html>
- <https://teamtreehouse.com/tracks/beginning-aspnet>

Course Evaluation:

Theory:

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

- End Semester Examination consists of 60 marks.

Practical:

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

Course Outcome(s):

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

SECE3610	Programming with .NET
CO 1	Understand the .NET Framework Architecture and Key Components
CO 2	Develop Console Applications Using C# Programming Language
CO 3	Apply Object-Oriented Programming Concepts in C# to Build Robust Applications
CO 4	Design and Develop Windows and Web Applications Using .NET Technologies

Mapping of CO with PO

SECE3610	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2		3						1	2
CO 2	2	3	3	1	3							2
CO 3	3	3	3	2	3				1			3
CO 4	2	3	2	2	3				1		2	3

Mapping of CO with PSO

SECE3610	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	3	2
CO 4	3	2	2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1.	Introduction To .Net Technology	1,2
2.	Basics of C# language using Console Application	1,2,4
3.	Object Oriented Programming in C#.NET	1,2,6
4.	Windows Forms and Controls	3,4,6
5.	Web Application using ASP .NET & ADO.NET	1,2,6
6.	Routing & State Management	2,5,6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT4630
Course Name: Cyber Security
Prerequisite Course(s): -

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

- To introduce the fundamentals of cyber security concepts and challenges.
- To understand common cyber threats, attacks, and defense mechanisms.
- To provide students with a comprehensive understanding of cryptography, network, and web security concepts, along with insights into cyber laws, ethical practices, and modern security advancements.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Cyber Security Overview of Cybersecurity: Importance, Scope, Challenges, and Careers, Cybersecurity Goals: Confidentiality, Integrity, Availability (CIA), Understanding Threat Actors: Hackers, Hactivists, Cybercrime, Cyberspace, Importance of Cybersecurity in Modern Society: Cyber Security Jobs and Industry Trends	04	13
2.	Cyber Attack & Defense Mechanism Security Challenges in Modern Computing Environments, Common Cyber Threats and Vulnerabilities, Overview of Cyber Defense Mechanisms: Security layered approach, firewalls, antivirus, and intrusion detection/prevention systems (IDS/IPS), Principles of least privilege and access control, Security monitoring and incident response basics	04	12
3.	Foundation of Cryptography Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography.	05	15
4.	Network Security Network Security Basics: OSI Layers, Firewalls, IDS/IPS, Secure Protocols: VPNs, SSL/TLS, HTTPS, SFTP, SCP, Network Threats: DDoS, ARP/DNS/DHCP Spoofing, Network Scanning Tools: Nmap, Wireshark, Case Study: Real-World Network Attack Analysis.	04	13
5.	Web and Application Security Web-based attacks: SQL Injection, Cross-Site Scripting (XSS), CSRF OWASP Top 10 vulnerabilities, Secure web design and coding principles, Role of authentication and session	03	10

	management, Overview of vulnerability assessment and penetration testing		
6.	Cyberspace Standards, Compliance and the Law Introduction, Cyber Security Regulations, Cybersecurity Standards: ISO 27001, NIST, GDPR, HIPAA, PCI-DSS, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013	03	10
7.	Digital Forensics and Incident Response Basics of digital forensics: scope and objectives, Stages of forensic investigation: identification, preservation, analysis, reporting, Tools used in forensics: EnCase, FTK, Autopsy (overview), Concepts of incident response lifecycle, Log analysis and tracing attacks, Role of Computer Emergency Response Teams (CERT-In)	04	15
8.	Emerging Areas and Future Trends Cloud security challenges and best practices, Internet of Things (IoT) vulnerabilities and mitigation, Artificial Intelligence and Machine Learning in cyber defense, Blockchain security concepts, Quantum cryptography overview, Recent global cyber incidents and lessons learned	03	12
	TOTAL	30	100

List of Tutorial:

Sr. No.	Name of Practical	Hours
1.	Study of cybersecurity fundamentals, vulnerabilities & threat types.	02
2.	Perform malware analysis using online sandbox tools.	02
3.	Network scanning using Nmap and Zenmap.	02
4.	Packet capture and analysis using Wireshark.	02
5.	Configure basic firewall rules on a system or VM.	02
6.	Demonstrate hashing & encryption algorithms using Python/online tools.	02
7.	Explore SSL/TLS certificate analysis for websites.	02
8.	Establish a Secure Connection using VPN or SSH.	02
9.	Perform SQL Injection & Cross-Site Scripting (XSS) attack testing on a sample vulnerable website (DVWA).	02
10.	Perform disk image acquisition and metadata analysis using Autopsy or FTK Imager.	02
11.	Conduct email header analysis for phishing detection.	02
12.	Network forensics: Extract metadata from pcap files.	02
13.	Study of digital evidence collection and chain of custody.	02
14.	Case study: Analysis of a major cyber-attack in industry.	02
15.	Mini Project: Vulnerability analysis and reporting.	02
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Nina Godbole & Sunit Belapure	Wiley India.
Network Security Essentials: Applications and Standards	William Stallings	Pearson Education

Reference Book(s):

Title	Author/s	Publication
Security in Computing	Charles P. Pfleeger	Pearson
Security Engineering	Ross J. Anderson	Wiley

Web Material Link(s)

https://onlinecourses.nptel.ac.in/noc23_cs127/preview

Course Evaluation:**Theory:**

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

Practical/Tutorial:

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

Course Outcome(s):

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

SEIT4630	Cyber Security
CO1	Understand the fundamental concepts of cyber security, its scope, importance, and the goals of information protection in digital systems.
CO2	Identify and analyze various cyber threats, vulnerabilities, and corresponding defense mechanisms in modern computing environments.
CO3	Apply the principles of cryptography, network, and web security to protect data and communication systems from cyber attacks.
CO4	Describe the role of cyber laws, policies, and international standards in ensuring legal compliance, data protection, and ethical practices in cyberspace.
CO5	Analyze the impact of emerging technologies such as cloud computing, IoT, blockchain, and artificial intelligence on cyber security strategies and solutions.

Mapping of CO with PO

SEIT4630	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1		2					1		2
CO 2	3	3	2	2	3	1						2
CO 3	2	2	3	2	3				1	1	1	2
CO 4	2	2	2	1	2	3	2	3	1			3
CO 5	2	2	2	2	3	2	2	2	1	2		3

Mapping of CO with PSO

SEIT4630	PSO 1	PSO 2	PSO 3
CO1	2	1	2
CO2	3	2	2
CO3	3	3	2
CO4	2	2	3

C05	3	2	3
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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 Cyber Security	1, 2
2.	Cyber Attack & Defense Mechanisms	2, 3
3.	Foundation of Cryptography	1, 2, 3
4.	Network Security	3, 4
5.	Web and Application Security	3, 4
6.	Cyberspace Standards, Compliance and the Law	1, 2
7.	Digital Forensics and Incident Response	2, 3, 4
8.	Emerging Areas and Future Trends	2, 4, 5

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4630

Course Name: Blockchain Technology

Prerequisite Course(s):

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

- To understand the fundamentals and architecture of blockchain systems.
- To analyze cryptographic methods, consensus mechanisms, and smart contracts.
- To evaluate blockchain applications, security issues, and emerging trends.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to Blockchain Technology Genesis & evolution of blockchain systems (Bitcoin origin), What is a blockchain? ledger, blocks, immutability, decentralization, Public vs permissioned blockchains, Applications beyond cryptocurrency: e-governance, supply-chain, identity management	04	13
2.	Cryptographic Primitives & Blockchain Components Cryptographic hash functions, digital signatures, Merkle trees, Block structure, transaction life-cycle, P2P networks, distributed ledger basics, decentralization model, Trust models and adversarial considerations	04	12
3.	Consensus Mechanisms & Blockchain Architecture Proof-of-Work (PoW), Proof-of-Stake (PoS) and other consensus models, Permissionless vs permissioned consensus, Architecture of enterprise blockchains, Hyperledger, state-machine replication	05	15
4.	Smart Contracts, DApps & Platforms Smart contract fundamentals: Solidity, EVM, deployment on Ethereum, Permissioned smart contract platforms: Hyperledger Fabric architecture, Decentralised applications (DApps) and tooling overview	04	13
5.	Blockchain Security, Privacy & Interoperability Security threats in blockchain: forks, 51% attack, double spending, Privacy concerns: anonymity, pseudonymity, Blockchain interoperability: cross-chain, sidechains, bridges	03	10
6.	Standards, Regulation & Legal Aspects Regulatory frameworks for blockchain and crypto currencies, Data protection, compliance issues in distributed ledger systems, Standards in blockchain systems and enterprise adoption	03	10
7.	Blockchain Use-Cases & Industry Applications Financial services: cross-border payments, trade finance,	04	15

	Supply chain, provenance, healthcare, identity management, Emerging domains: IoT + blockchain, energy sector		
8.	Emerging Trends & Future Directions Blockchain + AI/ML, IoT integration, Decentralised identity, tokenisation of assets, Challenges & research directions: scalability, quantum-resilience, Case study on recent blockchain Application	03	12
	TOTAL	30	100

List of Tutorial:

Sr. No	Name of Practical	Hours
13.	Study of blockchain concepts and Ethereum installation.	02
14.	Implement hashing and Merkle tree operations using Python.	02
15.	Analyze Bitcoin block data and transaction structure.	02
16.	Implement Proof-of-Work using Python (simple simulation).	02
17.	Explore Ethereum wallet creation and account management.	02
18.	Introduction to Solidity: Syntax, data types, basic contract.	02
19.	Write and deploy a simple smart contract on Remix IDE.	02
20.	Implement events and functions in Solidity contracts.	02
21.	Develop a token-based smart contract (ERC-20 basics).	02
22.	Case study: Supply chain tracking on blockchain.	02
23.	Case study: Blockchain for healthcare data management.	02
24.	Study of Hyperledger Fabric architecture and components.	02
25.	Comparison of public vs private blockchain with examples.	02
26.	Mini Project: Build and present a blockchain use-case prototype.	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Mastering Blockchain: Deeper Insights into Decentralization, Cryptography, Bitcoin, and Popular Blockchain Frameworks	Mohan Bashir	Apress

Reference Book(s):

Title	Author/s	Publication
Blockchain: Principles and Practices	Narayan Prusty	Packt Publishing
Blockchain for Business with Hyperledger Fabric: A decentralized architecture for autonomous business networks	Pradeep Kumar Poojari (ed.)	O'Reilly Media

Web Material Link(s)

- https://onlinecourses.nptel.ac.in/noc22_cs44/preview
- <https://www.coursera.org/courses?query=blockchain>

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 consists of 60 marks.

Practical/Tutorial:

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

Course Outcome(s):

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

SECE4630	Blockchain Technology
CO1	Understand the fundamental concepts, architecture, and components of blockchain technology.
CO2	Describe cryptographic techniques and consensus mechanisms used in blockchain systems.
CO3	Develop and deploy basic smart contracts and decentralized applications on blockchain platforms.
CO4	Analyze blockchain security issues, privacy concerns, and performance challenges..
CO5	Assess real-world blockchain applications, legal frameworks, and emerging technological trends.

Mapping of CO with PO

SECE4630	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1		2							2
CO 2	3	3	2	2	3							2
CO 3	2	2	3	2	3				1	1		2
CO 4	2	3	2	3	2	2		2				3
CO 5	2	2	2	2	2	3	2	3	1	2		3

Mapping of CO with PSO

SECE4630	PSO 1	PSO 2	PSO 3
CO1	2	2	2
CO2	3	2	2
CO3	3	3	2
CO4	2	3	3
CO5	2	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
9.	Introduction to Cyber Security	1, 2
10.	Cryptographic Primitives & Blockchain Components	2, 3
11.	Consensus Mechanisms & Blockchain Architecture	3, 4
12.	Smart Contracts, DApps & Platforms	3, 5
13.	Blockchain Security, Privacy & Interoperability	4, 5
14.	Standards, Regulation & Legal Aspects	2, 4
15.	Blockchain Use-Cases & Industry Applications	4, 5
16.	Emerging Trends & Future Directions	2, 6

**P P Savani University
School of Engineering**

Department of Computer Engineering

Course Code: SECE4610

Course Name: Natural Language Processing

Prerequisite Course (s):

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- comprehend the key concepts of NLP which are used to describe and analyze language
- illustrate computational methods to understand language phenomena of word sense
- design and develop applications with natural language capabilities.

Course Content:

Section I			
Module	Content	Hours	Weightage in %
1.	Introduction Introduction to NLP, History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, Phases of NLP, Challenges in NLP, NLP Libraries	07	25
2.	Language Modelling and Text Representation Unigram Language Model, Bigram, Trigram, N-gram, Applications of Language Modeling, Bag of Word Model, Skip gram, Continuous Bag-Of-Words, Embedding representations for words Lexical Semantics, Feature Weighing Techniques, Parts of Speech Tagging, Morphology.	08	25
Section II			
Module	Content	Hours	Weightage in %
3.	Word Sense Disambiguation Word Sense Disambiguation, Knowledge Based and Supervised Word Sense Disambiguation, Introduction to WordNet.	07	25
4.	Text Analysis, Summarization and Machine Translation Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in Multilingual Setting; NLP in Information Retrieval, Cross-Lingual IR, Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation (SMT)	08	25
TOTAL		30	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to NLP and related packages in Python	02

2.	Text Normalization	02
3.	Part of Speech tagging experiments	02
4.	Root word conversion (stemming and Lemmatization)	04
5.	Morphological analysis of text	02
6.	N-gram analysis of text	02
7.	Implementation of Bag of word model with different weighing techniques	02
8.	Implementation of word sense disambiguation models	02
9.	WordNet usage based experiment	04
10.	Named Entity Recognition experiment	04
11.	Text Classification based experiment	04
	TOTAL	30

Reference Book(s):

Title	Author/s	Publication
Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition,	Jurafsky, David, and James H. Martin	PEARSON
Foundations of Statistical Natural Language Processing.	Manning, Christopher D., and Hinrich Schütze.	Cambridge, MA: MIT Press
Natural Language Understanding.	James Allen.	The Benjamin/Cummings Publishing Company Inc..
Handbook of natural language processing.	Dale, R., Moisl, H., & Somers, H.,	CRC Press.

Web material link:

- <https://nptel.ac.in/courses/106/105/106105158/>
- <http://www.nptelvideos.in/2012/11/natural-language-processing.html>

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 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

SECE4610	Natural Language Processing
CO 1	Extract information from text automatically using concepts and methods from natural language processing (NLP) including stemming, n-grams, POS tagging, and parsing.

CO 2	Develop speech-based applications that use speech analysis (phonetics, speech recognition, and synthesis)
CO 3	Analyze the syntax, semantics, and pragmatics of a statement written in a natural language.
CO 4	Write scripts and applications in Python to carry out natural language processing using libraries such as NLTK, Gensim, and spaCY.
CO 5	Design NLP-based AI systems for question answering, text summarization, and machine translation.

Mapping of CO with PO

SECE4610	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3			3			1				3
CO 2	2		3		2							3
CO 3		3		3	3			1	2			3
CO 4			2	3	3					3		3
CO 5	3	2		3	3				3			3

Mapping of CO with PSO

SESE4610	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	2	3	
CO 3	3	3	2
CO 4	3	2	
CO 5	3	3	2

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1	Introduction	1,2
2	Language Modelling and Text Representation	3,4
3	Word Sense Disambiguation	3,4
4	Text Analysis, Summarization and Machine Translation	4,5,6

**P P Savani University
School of Engineering**

Department of Computer Science & Engineering (ML & AI)

Course Code: SEML4610

Course Name: Research Methodology

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	--	00	03	40	60	--	--	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help students to,

- provide brief knowledge about research and its various terminologies.
- Understand the possible area of research in computer science.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction Introduction to research problem, sources of finding a research problem, characteristics of a research problem, pitfalls in selecting a research problem, scope and objectives of research problem, approaches of investigation of solutions for research problem.	03	10
2.	Data Collection, Literature Search and Organization Sources of Data, Methods of Collecting data, Research Lifecycle, Virtual research environment, Scientific publishing process, Global publications, Research & Discovery, Authoring & Research Output, Peer Review, Publication & Distribution, Post publication, Research proposal, publication and writing order, literature search, keywords, Search engines, Sources for searching, Basic search strategies, Search operators, Organization of literature review, Alerts from search engines etc., Scientific network.	05	15
3.	Research steps and writing Types of Research Writing, Structure and components, Types of Research Paper, Different steps in writing report, Research Writing Strategies and references style.	05	15
4.	Research Methods and Methodology Differentiating between methodology and methods, Qualitative or quantitative Research	02	10

Section II			
5.	Intellectual Property Rights Introduction and significance of intellectual property rights, types of Intellectual Property Rights, copyright and its significance, introduction to patents and its filing, introduction to patent drafting, best practices in national and international patent filing, copyrightable work examples.	05	15
6.	Patent Right Patents and its basics, patentable items, designs, process of filing patent at national and international level, process of patenting and development, technological research and patents, innovation, patent and copyright international intellectual property, procedure for grants of patents, need of specifications, types of patent applications, provisional and complete specification, patent specifications and its contents, trade and copyright.	05	20
7.	New Developments in Intellectual Property Rights (IPR) Administration of patent system in India, India's stand in the world of IPs, new developments in IPR at national and international level, prosecution (filing) PCT / international filing, national phase filing, scope of patent rights, licensing and transfer of technology, patent information and databases, geographical indications, basic laws related to patent filing, case studies- IPR of Hardware, computer software.	05	15
TOTAL		30	100

List of Tutorials:

Sr. No.	Name of Tutorial	Hours
1.	Conduct good literature survey.	03
2.	Preparation of research proposal.	03
3.	Study reference management tools.	03
4.	Study new development in intellectual property rights and patent rights.	03
5.	Write research article.	03
TOTAL		15

Reference Book(s):

Title	Author/s	Publication
Research Methodology – Methods & Techniques	C R Kothari	New Age International Publishers
Resisting Intellectual Property	Halbert	Taylor & Francis Ltd
Introduction to Design	Rajesh Kariya	Prentice Hall
Research methodology: an introduction for science & engineering students	Stuart Melville and Wayne Goddard	Juta & Co Ltd
Intellectual Property Rights Under WTO	T. Ramappa	S. Chand, 2008
Research Methodology: A Step by Step Guide for Beginners	Ranjit Kumar	Pearson

Additional Readings:

- Students will be assigned and will select additional readings based on their research areas.

Web material link:

- <https://nptel.ac.in/courses/121/106/121106007/>

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 the performance of tutorials which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 50 marks.

Course outcome(s):

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

SEML4610	RESEARCH METHODOLOGY
CO 1	Identify and formulate research problems by understanding their characteristics, sources, scope, objectives, and common pitfalls.
CO 2	Apply appropriate data collection methods and perform effective literature searches using databases, search strategies, keywords, and research lifecycle tools.
CO 3	Write structured research papers and reports by following proper writing steps, formats, components, and referencing styles.
CO 4	Differentiate between qualitative and quantitative research methodologies and select suitable methods for solving research problems.
CO 5	Evaluate Intellectual Property Rights and patent systems by examining filing procedures, drafting requirements, licensing practices, and emerging global developments.

Mapping of CO with PO

SEML4610	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2	2	1				1	2	1	2
CO 2	2	3	2	3	2				1	2	1	3
CO 3	1	2	1	2	1				2	3	3	2
CO 4	3	3	2	3	2				1	2	1	3
CO 5	2	2	2	1			3	1	1	3	2	2

Mapping of CO with PSO

SEML4610	PSO1	PSO2	PSO3
CO 1	2	3	3
CO 2	2	3	3
CO 3	1	3	3
CO 4	2	2	3
CO 5	1	3	3

Level of Revised Bloom's Taxonomy in Assessment

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

Module No	Content	RBT Level
1	Introduction	1,2
2	Data Collection, Literature Search and Organization	2,3,4
3	Research steps and writing	3,4,6
4	Research Methods and Methodology	2
5	Intellectual Property Rights	2,4
6	Patent Right	2,4
7	New Developments in Intellectual Property Rights (IPR)	2,4