PPSU

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

B. Sc. (INFORMATION TECHNOLOGY)

WITH HONORS

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

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

PSO No	PROGRAMME SPECIFIC OUTCOMES (PSO) B. Sc. (INFORMATION TECHNOLOGY)
PSO 1	Design, implement and evaluate computer-based system, process, component or program to meet desired output.
PSO 2	Analyse the local and global impact of computing on individuals, organizations and society.
PSO 3	Prepare technically competent employee, researcher, entrepreneur, excel in competitive exams, and boost passion for the 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. Sc. (IT) with Provision of Honors

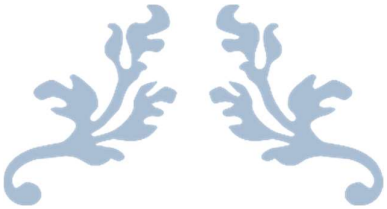
P P Savani University

School of Engineering

Effective From: 2024-25

Authored by: P P Savani University

CONTENT



FIRST YEAR B. SC. (IT)

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING
INSTITUTE OF COMPUTER SCIENCE AND APPLICATION

TEACHING & EXAMINATION SCHEME FOR B.Sc.IT PROGRAMME with Provision of Honors (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	SESH1040	Mathematics for Computer Applications	SH	03	-	02	05	05	40	60	-	-	50	00	150
	SSCA1010	Web Application Design & Development-I	CA	01	04	-	05	03	00	00	100	00	-	-	100
	SSCA1020	Introduction to Computer Organization	CA	03	-	02	05	05	40	60	-	-	50	00	150
	SSCS1010	Introduction to Computer Programming	CS	03	04	-	07	07	40	60	40	60	-	-	200
	CFLS2110	Elementary Communicative English-I	CFLS	03	-	-	03	03	100	00	-	-	-	-	100
						Total	**25**	**23**							**700**
2	SESH2060	Statistics	SH	03	-	02	05	05	40	60	-	-	50	00	150
	SSCA1030	Database Management System	CA	03	04	-	07	05	40	60	40	60	-	-	200
	SSCS1021	Data Structures	CS	03	02	-	05	04	40	60	20	30	-	-	150
	SSCS1031	Object Oriented Programming with C++	CS	03	04	-	07	05	40	60	40	60	-	-	200
	CFLS2120	Elementary Communicative English-II	CFLS	02	-	-	02	02	100	00	-	-	-	-	100
						Total	**26**	**21**							**800**

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Science & Humanities

Course Code: SESH1040
Course Name: Mathematics for Computer Applications
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	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- provide foundation of data representation, logical implementation of data.
- educate mathematical concepts to recognize their applications in computer domain.
- demonstrate a basic understanding of a function, its inverse, composition, and notation.
- model and analyze computational processes using analytic and combinatorial methods.

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Number System:** Introduction to Number System, Base, Types of Number Systems, Conversion Between Number Bases, Arithmetic Operations - Addition, Subtraction, Multiplication and Division for Binary, Octal, Hexadecimal Systems, Signed Unsigned Numbers, Binary Coding - BCD, ASCII, EBCDIC, Floating Point Representation of Numbers and Arithmetic Operation with Normalized Floating-Point Numbers.	08	18
2.	**Mathematical Logic:** Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers.	07	16
3.	**Elementary Combinatorics:** Introduction, Basic Counting Principles, Permutation and Combination, Mathematical Induction.	06	14
Section I			
4.	**Matrix Algebra:** Introduction, Types of Matrices, Operations of Matrices, Adjoint Matrices, Solution of System of Equations by Matrix Inversion Method, Applications of Matrix.	07	16

5.	**Determinants:** Formation of Determinants, Minors and Cofactors of the Elements of a Determinant, Properties of Determinants, Applications of Determinants in Computer Science, Cramer's Rule.	08	17
6.	**Analytical Geometry:** Introduction to Cartesian coordinate system, Straight line, Slope of Straight line, Intersection of two straight lines, Equation of circle, Centre and Radius, Tangent, Equation of Parabola, Hyperbola and Ellipse.	09	19
	TOTAL	**45**	**100**

List of Tutorials:

Sr. No	Name of Tutorial	Hours
1.	Number System-1	02
2.	Number System-2	04
3.	Mathematical Logic	04
4.	Elementary Combinatorics	04
5.	Matrix Algebra-1	02
6.	Matrix Algebra-2	04
7.	Determinants-1	02
8.	Determinants-2	04
9.	Analytical Geometry-1	02
10.	Analytical Geometry-2	02
	TOTAL	**30**

Text Book (s):

Title	Author/s	Publication
Discrete Mathematics	T. Veerarajan	Tata McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Discrete Mathematics and its Applications	Kenneth H. Rosen	Tata McGraw Hill
Discrete Mathematical Structures with Applications to Computer Science	J. P. TremblayR. Manohar	Tata McGraw Hill
Analytical Geometry: 2D and 3D	P R Vittal	Pearson
Introduction to Computer Science	ITL ESL	Pearson

Web material link:

- http://nptel.ac.in/courses/106106094/
- http://nptel.ac.in/courses/117103064/4
- http://nptel.ac.in/courses/122107036/17

Course Evaluation:

Theory:

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

Tutorial:

- Continuous Evaluation consists of performance of tutorial which will be evaluated out of 10 marks for each practical and average of the same will be converted to 20 marks.
- Internal viva consists of 15 marks.
- Viva/ Oral performance consists of 15 marks.

Course Outcome(s):

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

SESH1040	MATHEMATICS FOR COMPUTER APPLICATIONS
CO 1	Convert decimal to binary, octal, hexadecimal for data representation and calculate arithmetic operations.
CO 2	Compute permutations and combinations on a given set of data.
CO 3	Evaluate the solution of system if linear equations through elimination method.
CO 4	Discuss the equation of straight line in different forms and related properties.

Mapping of CO with PO

SESH1040	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	1								
CO 2	2	2	1	1								
CO 3	2	2	1	1								
CO 4	2	2	1	1								

Mapping of CO with PSO

SESH1040	PSO1	PSO2	PSO3
CO 1	1	1	
CO 2	1	1	
CO 3	1	1	
CO 4	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	Number System	1,2,3,5
2	Mathematical Logic	1,2,4,6
3	Elementary Combinatorics	1,2,3,5
4	Matrix Algebra	1,2,3,5
5	Determinants	1,2,3,5
6	Analytical Geometry	1,2,3,5

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Application

Course Code: SSCA1010
Course Name: Web Application Design & Development - 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	
01	04	-	03	00	00	100	00	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- Understand basic components of internet.
- Learn basic web technologies such as HTML, JavaScript and CSS.
- Develop basic knowledge of website designing.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** World Wide Web, Web Server, Website, Website design principles, planning the website, navigation	02	10
2.	**HTML** HTML Basics, HTML Attributes, HTML Headings, HTML Paragraphs, HTML Styles, HTML Text Formatting, HTML Links, HTML Images	03	20
3.	**CSS** CSS Syntax, CSS Colors, CSS Background, CSS Border, CSS Margin, CSS Box Model, CSS Text, CSS Fonts.	03	20
Section II			
Module No.	Content	Hours	Weightage in %
4.	**JavaScript** Syntax of JavaScript, external file, folder, URL, JavaScript Statements, JavaScript Variables, JavaScript Arithmetic, JavaScript String Concatenation, JavaScript Datatypes, JavaScript Functions, JavaScript different methods.	05	30
5.	**Bootstrap CSS** Introduction to Bootstrap CSS, Content Delivery Network, Bootstrap classes.	02	20
	TOTAL	**15**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Implement HTML Attributes, HTML Headings and HTML Paragraphs.	04
2.	Implement HTML Styles and HTML Text Formatting.	02
3.	Implement code to add Links in HTML.	02
4.	Implement code to add Images in HTML.	02
5.	Implement code to create different types of frame using HTML.	04
6.	Create a static web page using HTML to display P P Savani University information.	04
7.	Write JavaScript program to show the implementation of JavaScript inside head, body, external file, folder, URL.	02
8.	Write a program to perform arithmetic operations in JavaScript.	02
9.	Write a program to concatenate two Strings in JavaScript.	02
10.	Write a program to show the use of functions in JavaScript.	02
11.	Write a JavaScript function to check whether a string is blank or not.	04
12.	Write a program to show the use of math functions in JavaScript.	02
13.	Write a program to show the use of random function in JavaScript.	02
14.	Write a program to implement arrays in JavaScript.	02
15.	Write a program to implement CSS Colors, CSS Background, CSS Border and CSS Margin.	04
16.	Write a program to show the use of CSS Box Model.	04
17.	Write a program to implement CSS Text colors and size.	02
18.	Write a program to implement CSS Fonts styles.	02
19.	Write a program to implement Bootstrap classes.	02
20.	Create a website as a mini project in this subject.	10
	TOTAL	**60**

Reference Book (s):

Title	Author/s	Publication
HTML Black Book	Steven Holzner	Dreamtech Press
JavaScript by Examples	Dani Akash	Packt
HTML & CSS: Design and Build Web Sites	Jon Duckett	Wiley
Step by Step Bootstrap 3: A Quick Guide to Responsive Web Development Using Bootstrap 3	RiwantoMegosinarso	Kindle Edition

Web Material Link(s):

- https://www.w3schools.com/
- https://www.guru99.com/interactive-javascript-tutorials.html
- https://htmldog.com/guides/javascript/

Course Evaluation:

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 marks per each practical. At the end of the semester, the average of the entire practical will be converted to 50 marks.

- Internal viva consists of 50 marks.

Course Outcome(s):

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

SSCA1010	WEB APPLICATION DESIGN & DEVELOPMENT - I
CO 1	Describe the concepts of www including browser and http protocol.
CO 2	List various html tags and use them to develop the user-friendly web pages.
CO 3	Define and describe css with its types and use them to provide the styles to the web pages using the html and css features with different layouts as per need of applications.
CO 4	Use the java script to develop the dynamic web pages.
CO 5	Implement the boot strap to develop the dynamic web pages.

Mapping of CO with PO

SSCA1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2			2							2
CO 2	3	3	2		2							2
CO 3	2	3	2		3							2
CO 4	3	2	2		3							2
CO5	2	3	2		3							2

Mapping of CO with PSO

SSCA1010	PSO1	PSO2	PSO3
CO 1	3	3	
CO 2	3	3	
CO 3	3	3	
CO 4	2	2	
CO 5	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	1,2
2	HTML	2,3
3	CSS	2,3
4	JavaScript	1,2,3
5	Bootstrap CSS	2,3

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Application

Course Code: SSCA1020
Course Name: Introduction to Computer Organization
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	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to
- impart basic concepts of computer architecture and organization.
- explain key skills of constructing cost-effective computer systems.
- help students in understanding various memory devices

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Computer Data Representation** Data Representation: decimal, binary, octal and hexadecimal numbers, conversion from one number system to another, fixed point representation, signed magnitude, 1's complement and 2's complement representation, addition and subtraction of binary numbers using different representation.	08	20
2.	**Computer Architecture & Register-Transfer and Micro-operations** Overview of computers and basics of Digital Electronics-Flip Flops, Registers, Shift registers, Register - Transfer-Language, Register Transfer, Bus Transfer and Memory Transfer, Arithmetic Micro-Operations Addition, Subtraction, Complements, Negation, Increment and Decrement, Logic micro operations, Shift Micro operation.	08	15
3.	**Basic Computer Organization** Instruction codes, Computer registers, Computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt	07	15

Section II			
4.	**Computer Arithmetic** Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point arithmetic operations	06	18
5.	**Memory Organization** Memory Hierarchy, Associative Memory, Cache Memory, Virtual Memory	06	12
6.	**Input-Output Organization** Input-Output Interface, Asynchronous Data Transfer, Modes of Data Transfer, DMA Transfer	06	10
7.	**Microprocessor and Parallel Processing** Block diagram of 8086, Registers and applications of microprocessor, Parallel Processing – Flynn's classification, Pipelining.	04	10
	TOTAL	**45**	**100**

List of Tutorials:

Sr. No	Name of Tutorial	Hours
1.	Computer Data Representation-1	02
2.	Computer Data Representation-2.	02
3.	Register Transfer Micro-operations-1	02
4.	Basic Computer Organization-1.	02
5.	Basic Computer Organization-2.	02
6.	Computer Arithmetic-1	02
7.	Computer Arithmetic-2	02
8.	Computer Arithmetic-3	02
9.	Computer Arithmetic-4	02
10.	Memory Organization-1	02
11.	Memory Organization-2	02
12.	Input-Output Organization-1	02
13.	Input-Output Organization-2	02
14.	Microprocessor and Parallel Processing-1	02
15.	Microprocessor and Parallel Processing-2	02
	TOTAL	**30**

Reference Book(s):

Title	Author/s	Publication
Computer System Architecture	M. Morris Mano	Pearson
Computer Architecture and Organization	Ghoshal, Subrata	Pearson
Computer Architecture &Organization	M. Murdocca & V. Heuring	WILEY

Web material link:

- https://nptel.ac.in/courses/106/105/106105163/
- http://www.intel.com/pressroom/kits/quickreffam.htm
- https:// web.stanford.edu/class/ee282/

Course Evaluation:

Theory:

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

Tutorial:

- Continuous Evaluation consists of performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 25 marks.
- Quiz/test at the end of semester consists of 25 marks of evaluation.

Course Outcome(s):

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

SSCA1020	INTRODUCTIN TO COMPUTER ORGANIZATION
CO1	Gain a basic understanding of computer arithmetic.
CO2	Learn memory organization and types of backups in computer systems.
CO3	Develop various office automation applications.
CO4	Learn to assemble various computer hardware and middleware.

Mapping of CO with PO

SSCA1020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3			1	1					1		1
CO 2	2				1					1		3
CO 3	2	1	2	2	3							1
CO 4	1	1	1	1	1					1		1

Mapping of CO with PSO

SSCA1020	PSO1	PSO2	PSO3
CO 1	3	1	1
CO 2	2	2	1
CO 3	3	2	1
CO 4	2		1

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

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

Module No	Content	RBT Level
1	Computer Data Representation	1,2
2	Computer Architecture & Register-Transfer and	2,3

	Micro-operations	
3	Basic Computer Organization	1,2
4	Computer Arithmetic	1,2,3
5	Memory Organization	1,2
6	Input-Output Organization	1,2
7	Microprocessor and Parallel Processing	1,2,4

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Science

Course Code: SSCS1010
Course Name: Introduction to Computer 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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand how programming can help to solve real time problems.
- identify appropriate approach to computational problems.
- develop logic building and problem-solving skills.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Computer Programming** Introduction to programs, its significance, classification of programming language, Selection of a programming language.	02	04
2.	**Introduction to C Programming** Features of C language, structure of C Program, Development of program, Algorithm and flowchart, Types of errors, debugging, tracing/stepwise execution of program, watching variables values in memory.	07	16
3.	**Constants, Variables and Data Types** Character Set, C tokens, Keywords, Constants and Variables, Data types in C programming, typedef, enum, basic input and output operations.	06	15
4.	**Operators and Expression and Managing I/O Operations** Introduction to Operators and its types, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Operator precedence and associatively, Input and output of different types of data in C language, a character, formatted input, formatted output.	08	15

Section II			
Module No.	Content	Hours	Weightage in %
5.	**Conditional Statements and Branching** Decision Making & branching: Decision making with if &if ... else statements, if - else statements (Nested Ladder), The Switch & go-to statements, The ternary (? :) Operator Looping: The while statement, The break statement & The Do. While loop, The FOR loop, Jump within loops - Programs.	07	20
6.	**Arrays and Strings** Introduction to array, One dimensional array, Two dimensional arrays, Declaring and initializing string variables, Arithmetic operations on Characters, Putting strings together, Comparison of two strings, Basic String Handling Functions.	07	15
7.	**User-Defined Functions, Structure and Union** Concepts of user defined functions, prototypes, definition of function, parameters, parameter passing, calling a function, recursive function, Structure definition, declaring and initializing Structure variables, Accessing Structure members, Union.	08	15
	TOTAL	**45**	**100**

List of Practical:

Sr No	Name of Practical	Hours
1.	Introduction to Basic Unix Commands-I	02
2.	Introduction to Basic Unix Commands-II	02
3.	Implement Basic C Programs using scanf() and printf()	02
4.	Implement Basic C Programs to demonstrate different types of operators	02
5.	Implementation in C for conditional statement: if()...else{}	02
6.	Implementation in C for conditional statement: Nested if()....else{}	02
7.	Implementation in C for conditional statement: if()...else if().....else{}	02
8.	Implementation in C for conditional statement using switch()....case{}	02
9.	Implementation in C for branching using goto	02
10.	Implement C program using while and do….whileloop	06
11.	Implement C program using for loop for different problems	04
12.	Implement C program using loopsto print different types of patterns	04
13.	Implement C program using for loop for series problems	04
14.	Implementation in C using 1D Array and 2D Array	08
15.	Write a C program to find length of a string without using in-built functions	02
16.	Implement String programs in C to copy, concatenate and compare given strings	04
17.	Implement a program to demonstrate user defined functions	02
18.	Implement a program to demonstrate recursive solution for factorial problem	04
19.	Implementation in C Structures and Unions	04
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication

Programming in ANSI C	E. Balagurusamy	Tata McGraw Hill
Introduction to Computer Science	ITL Education Solutions Limited	Pearson Education

Reference Book(s):

Title	Author/s	Publication
Programming in C	Ashok Kamthane	Pearson
Let Us C	Yashavant P. Kanetkar	Tata McGraw Hill
Introduction to C Programming	ReemaThareja	Oxford Higher Education

Web Material Link(s):

- https://www.javatpoint.com/c-programming-language-tutorial
- https://nptel.ac.in/courses/106105085/4
- https://fresh2refresh.com/c-programming/

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
- 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 per each practical. At the end of the semester, the 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.
- External viva consists of 30 marks.

Course Outcome(s):

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

SSCS1010	INTRODUCTIN TO COMPUTER PROGRAMMING
CO 1	Understand the basic concepts of programming.
CO 2	Implement efficient program with their own logic and capabilities.
CO 3	Apply the concept of functions to achieve reusability in coding.
CO 4	Develop an application using the concepts of array, pointer, structure, and file management to solve engineering and/or scientific problems.
CO 5	Translate algorithm/flowchart into c program using correct syntax and execute it.

Mapping of CO with PO

SSCS1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2										2
CO 2	2	3	2									2

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

Mapping of CO with PSO

SSCS1010	PSO1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	2
CO 3	3	2	2
CO 4	2	1	
CO 5	3	2	2

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

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

Module No	**Content**	**RBT Level**
1	Introduction to Computer Programming	1,2
2	Introduction to C Programming	1,2
3	Constants, Variables and Data Types	1,2
4	Operators and Expression and Managing I/O Operations	1,2,3
5	Conditional Statements and Branching	1,2,3
6	Arrays and Strings	2,3
7	User-Defined Functions, Structure and Union	2,3

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Science & Humanities

Course Code: SESH2060
Course Name: 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	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- Demonstrate understanding of statistical methods in support of the analysis, design and application for problem solving in the field of computer science and applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Data & Descriptive Statistics** Elements, Variables, and Observations, Scales of Measurement , Categorical and Quantitative Data, Cross-Sectional and Time Series Data, Summarizing Categorial Data and Quantitative Data, Frequency Distribution, Relative Frequency and Percentage Distributions, Bar Charts and Pie Charts, Dot Plot, Histogram, Cumulative Distributions, Ogive, Measures of Location: Mean, Median, Mode, Percentiles and Quartiles, Measures of Variability: Range, Interquartile Range, Variance, Standard Deviation, Coefficient of Variation.	10	25
2.	**Exploratory Data Analysis** Distribution Shape, z −Scores, Chebyshev's Theorem, Empirical Rule, Outliners, Five Number Summary, Box Plot.	07	15
3.	**Correlation Analysis** Type and properties of Correlation, Karl-Pearson's coefficient.	05	10
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Introduction to Probability** Experiments, Counting Rules, Assigning Probabilities, Events and their Probabilities, Relationships of Probabilities, Conditional Probability, Bayes' Theorem	06	10

5.	**Discrete and Continuous Probability Distribution** Random Variables, Discrete Probability Distributions, Expected Values and variance, Binomial Probability Distribution, Poisson Probability Distribution, Uniform Probability Distribution, Normal Probability Distribution.	10	25
6.	**Testing of Hypothesis** Introduction, Sampling, Tests of Significance, Null Hypothesis, Alternative Hypothesis, Type 1 and Type 2 errors, Level of Significance, Chi-square test, Student's *t*-test, Seducer's *F*-test.	07	15
	TOTAL	**45**	**100**

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	Introduction to various statistical tools.	02
2.	Implementation of Data & Descriptive Statistics-1.	02
3.	Implementation of Data & Descriptive Statistics-2.	02
4.	Implementation of Data & Descriptive Statistics-3.	02
5.	Implementation &Exploratory Data Analysis.	02
6.	Correlation Analysis	02
7.	Introduction to Probability	02
8.	Discrete and Continuous Probability Distribution-1.	02
9.	Discrete and Continuous Probability Distribution-2.	02
10.	Discrete and Continuous Probability Distribution-3.	06
11.	Testing of Hypothesis	04
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Statistics for Business and Economics	David R. Anderson Dennis J. Sweeney Thomas A. Williams	Cengage Learning

Reference Book(s):

Title	Author/s	Publication
Understandable Statistics Concepts and Methods	Charles Henry Brase Corrinne PellilloBrase	Houghton Mifflin Company

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

SESH2060	STATISTICS
CO 1	Elaborate analysis of categorial data and quantitative data.
CO 2	Examine the box plot for real data and able to find the outliers.
CO 3	Adapt the knowledge of various probability distribution and their applications in mathematical models, sport strategies and insurance.
CO 4	Adapt the knowledge of various probability distribution and their applications in insurance, banking and sentiment analysis.

Mapping of CO with PO

SESH2060	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	1	2								1
CO 2	3	2	1	2								1
CO 3	3	2	1	2								1
CO 4	3	2	1	2								1

Mapping of CO with PSO

SESH2060	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	1	1	1
CO 3	2	1	1
CO 4	1	2	1

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

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

Module No	Content	RBT Level
1	Introduction to Data & Descriptive Statistics	1,2,3,5
2	Exploratory Data Analysis	1,2,3,4
3	Correlation Analysis	2,3,4,5
4	Introduction to Probability	2,3,5
5	Discrete & Continuous Probability Distribution	1,2,3,4
6	Testing of Hypothesis	1,2,3,4

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Application

Course Code: SSCA1030
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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** File Organization, Comparison of File with DBMS, Application of DBMS, Purpose of DBMS, Views of data - level of abstraction, Data Independence, Database Architecture, Database Users & Administrators.	04	10
2.	**Relational Model** Structure of relational databases, Domains, Relations, Relational algebra- operators and syntax, Relational algebra queries.	04	10
3.	**DBMS Concepts** Components of Data Base Management System, Query Language: DDL, DML, TCL, Database Users: DBA, Programmer, Other Users, Data Independence: Logical & Physical Functional, Types of Keys & Data Integrity, Keys: Super Key, Candidate Key, Primary Key, Alternate Key, Foreign Key, Constraints, Domain Integrity, Referential Integrity, and Entity Integrity.	10	20
4.	**Built-in functions & Transaction Control** IN operator, Aggregate functions, Built-in functions: numeric, date, string functions, set operations, Sub queries, and correlated sub-queries: Join, Exist, Any, All, view and its types. Transaction Control Commands- Commit, Rollback, Save point.	05	10

Section II			
Module No.	Content	Hours	Weightage in %
5.	**Entity Relational Model** Entity-Relationship Model: Basic concepts, Design process Constraints, Keys, Design issues, E-R diagrams, Weak entity sets, extended E-R features- Generalization, Specialization, Aggregation, Reduction to E-R Database Schema.	08	20
6.	**Normalization** Need of Normalization (Consequences of Bad Design-Insert, Update & Delete Anomalies), Normalization, First Normal Form, Second Normal Form, Third Normal Form, BCNF.	10	20
7.	**Transaction Management** Transaction concepts, Properties of Transactions, Serializability of Transactions, Testing for serializability, system recovery, Two-Phase Commit protocol, Recovery and Atomicity, Log-based recovery, Concurrent executions of transactions and related problems, Locking mechanisms, Solution to Concurrency Related Problems, Deadlock, Two phase locking protocol.	04	10
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to DBMS, SQL and SQL tools.	02
2.	Implementation of a client-server architecture using tight VNC Server and Client software (remote access of a server by clients)	02
3.	Introduction to Data Dictionary concepts.	02
4.	Create all the master tables using Data Definition Language Commands like Create and Describe.	02
5.	Implement the use of alter table command.	02
6.	Introduction to Transaction Control Commands like Commit, Rollback and Savepoint.	02
7.	Use insert command to add data into created tables.	02
8.	Solve queries using update command.	02
9.	Implement SQL queries based on update and delete command.	02
10.	Write SQL queries to solve problems with use of select command.	02
11.	Generate different reports using select command.	02
12.	Introduction to SQL functions.	02
13.	Write the required SQL scripts to implement the listed queries, which require the usage of numerous SQL functions.	02
14.	Introduction to group functions and demonstration of their usage.	04
15.	Implement queries based on group by and having clause.	02
16.	Execution of queries based on natural and inner Joins.	02
17.	Implement SQL queries based on outer join and self-join.	02
18.	Write SQL queries based on group function and join.	04
19.	Introduction to sub-queries and demonstration of their usage.	02

20.	Write SQL queries based on concept of single row sub-queries.	02
21.	Write SQL queries based on concept of multiple row sub-queries.	02
22.	Write SQL scripts to generate desired reports using group by, join and sub-queries.	04
23.	Write SQL script to solve the questions based on all SQL concepts.	04
24.	Submission of DBMS Mini Project Design	06
	TOTAL	**60**

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

- https://www.tutorialcup.com/dbms
- https://www.geeksforgeeks.org/dbms/
- https://onlinecourses.nptel.ac.in/noc18_cs15

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the 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.
- External viva consists of 30 marks.

Course Outcome(s):

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

SSCA1030	DATABASE MANAGEMENT SYSTEM
CO1	Understand the importance of back end design and relational database management system to provide database connectivity in applications.

CO2	Discriminate physical data, conceptual data and its conversion into relational databases to perform normalization of data.
CO3	Apply various database constraints on relational databases.
CO4	Device database design for the development of software projects
CO 5	Create databases and related objects using MySQL queries to provide storage to large scale datasets.

Mapping of CO with PO

SSCA1030	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2		2	3	2	2		2	3	2
CO 2	3	3	2	2	2							
CO 3	3	2	2	2	2							
CO 4	3	3	2	3	3							
CO 5	2	2	2	3	3							

Mapping of CO with PSO

SSCA1030	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	3	2
CO 3	3	2	2
CO 4	3	3	2
CO 5	3	2	2

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

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

Module No	Content	RBT Level
1	Introduction	1,2
2	Relational Model	1,2
3	DBMS Concepts	1,2,3
4	Built-in functions & Transaction Control	1,2,3
5	Entity Relational Mode	1,2
6	Normalization	1,2,3
7	Transaction Management	1,2

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Science

Course Code: SSCS1021
Course Name: Data Structures
Prerequisite Course(s): -- Introduction to Computer Programming (SSCS1010)

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

- 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** Object and Instance, Object Oriented Concepts, Data types, Types of Data Structure, Abstract Data Types.	03	5
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.	**Pointers and File Management** Basics of Pointers, a Chain of Pointers, Pointer and Array, Pointer to an Array, an Array of Pointers, Pointers and Functions, Dynamic Memory Allocation. Introduction to file Management and its Functions.	08	15
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 Queues, Applications of Stack & Queue.	08	20
Section II			

Module No.	Content	Hours	Weightage in %
5.	**Linked List-Part I** Dynamic Memory Allocation, Structure in C, Singly Linked List, Doubly Linked List, circular linked list.	08	20
6.	**Linked List-II and Applications of Linked List** Linked implementation of Stack, Linked implementation of Queue, Applications of Linked List.	08	20
7.	**Searching and Sorting** Linear Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Radix sort.	06	10
	TOTAL	**45**	**100**

List of Practical:

Sr No	Name of Practical	Hours
1.	Introduction to Dynamic Memory Allocation	02
2.	Revision of Structures in C	02
3.	Working with pointer in C (initialization, pointer to pointer, pointer and array, an array of pointer, pointer and function)	02
4.	Working with files in C (opening a file, data insertion, and extraction from file, file management functions)	02
5.	Write a program to implement stack and perform push, pop operation.	02
6.	Write a program to perform the following operations in linear queue – Addition, Deletion and Traversing.	02
7.	Write a program to perform the following operations in circular queue – Addition, Deletion, and Traversing.	02
8.	Write a program to perform the following operations in singly linked list – Creation, Insertion, and Deletion.	02
9.	Write a program to perform the following operations in doubly linked list – Creation, Insertion, and Deletion.	02
10.	Write a program to perform Insertion sort.	02
11.	Write a program to perform Selection sort.	02
12.	Write a program to perform Insertion sort.	02
13.	Write a program to perform Bubble sort.	02
14.	Write a program to perform Linear Search sort.	02
15.	Write a program to perform Binary Search sort.	02
	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	Prenctice-Hall

Fundamentals of Computer Algorithms	E. Horowitz, Sahni, and S. Rajsekaran	Galgotia Publication
Data Structures: A Pseudo-code approach with C	Gilberg & Forouzan	Thomson Learning
Data & File Structure	Rohit Khurana	Vikas Publication
C & Data Structures	P S Deshpande, O. G. Kakde	CharlesRiver Media

Web Material Link(s):

- https://www.coursera.org/learn/data-structures
- https://nptel.ac.in/courses/106102064/
- https://nptel.ac.in/courses/106106127/

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the average of the entire practical will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 15 marks.
- External viva consists of 15 marks.

Course Outcome(s):

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

SSCS1021	**DATA STRUCTURES**
CO1	Learn fundamentals of data structures and explain the concepts of array, stack in various applications.
CO2	Apply different data structures for given problems.
CO3	Apply sorting and searching algorithms to the small and large datasets.
CO4	Analyze algorithms for specific problems.

Mapping of CO with PO

SSCS1021	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	2	2	2	2	2						
CO 2	3	3	2	2	2	2						
CO 3	2	3	2	2	2	2						
CO 4	2	2	3	3	3							

Mapping of CO with PSO

SSCS1021	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	3	2

CO 3	3	3	2
CO 4	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	1,2
2	Array	1,2
3	Pointers and File Management	1,2,3
4	Stack and Queue	1,2,3
5	Linked List-Part I	1,2,3
6	Linked List-II and Applications of Linked List	1,2,3
7	Searching and Sorting	1,2,3,4

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Science

Course Code: SSCS1031
Course Name: Object Oriented Programming with C++
Prerequisite Course(s): Introduction to Computer Programming (SSCS1010)

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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- define & describe the basic concepts of the Object-Oriented Programming Paradigm.
- understand functions in C++ and the different types of Constructors in C++.
- understand on Operator Overloading.
- understand the different types of Inheritance.
- understand on Stream Classes and Files.

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Basic concepts of Object Oriented Programming** Object-Oriented Programming (OOP) Paradigm – Basic Concepts of OOP – Benefits of OOP – Tokens – Keywords – Identifiers and Constants - Basic Data Types – User-Defined Data Types – Storage Classes – Derived Data Types – Symbolic Constants – Type Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables- Operators in C++ – Scope Resolution Operator – Member Dereferencing Operators – Memory Management Operators – Manipulators – Type Cast Operator - Expressions and Their Types – Special Assignment Expressions – Implicit Conversions – Operator Overloading – Operator Precedence – Control Structures.	10	20
2.	**Functions in C++** Functions in C++ – The Main Function – Function Prototyping – Call By Reference – Return by Reference – Inline Functions – Default Arguments – 'const' Arguments – Recursion – Function Overloading – Friend and Virtual functions – Math Library Functions - Classes and Objects – Specifying a Class – Defining Member Functions – Making an Outside Function Inline – Nesting of Member Functions –	08	15

	Private Member Functions – Arrays within a Class - Memory Allocation for Objects – Static Data Members – Static Member Functions – Array of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects – 'const' Member Functions – Pointers to Members – Local Classes.		
3.	**Constructors and Destructors** Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructors – Dynamic Constructors – Constructing Two-Dimensional Arrays – 'const' Objects – Destructors – Operator Overloading – Rules for Overloading Operators – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators Using Friends – Manipulation of Strings Using Operators – Type Conversions.	05	15
Section II			
Module No.	**Content**	**Hours**	**Weightage in %**
4.	**Inheritance** Inheritance – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance - Virtual Base Classes – Abstract Classes – Constructors in Derived Class – Nesting of Classes – Pointers – Pointers to Objects – 'this' Pointer – Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions – Virtual Constructors and Destructors.	08	20
5.	**Array & Strings** Introduction, advantage, One, Two and Multidimensional, Passing Array to a Function, Array and Pointers : Pointer to One and Two Dimensional Arrays, Dynamic Arrays, array containers, Array of Pointers,	04	10
6.	**C++ Streams** C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O operations – Managing Output with Manipulators - Files – Classes for File Stream Operations – Opening and Closing a File – Detecting Endof- File – Open () File Modes – File Pointers and their Manipulators - Sequential Files – Random Access Files – Error Handling during File Operations – Command-Line Arguments.	10	20
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to C++ basic input/output functions, library files.	04
2.	Implementation of C++ programs with classes and objects.	04
3.	Implement C++ program to demonstrate use of data types, tokens and constants.	04
4.	Implementation of C++ programs to demonstrate dynamic initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator.	04

5.	Implementation of C++ programsto demonstrate use of member referencing, operators – Memory Management Operators – manipulators.	04
6.	Implementation of C++ programs for call by reference and return by reference	04
7.	Implement of C++ programs for use of inline function	04
8.	Implementation of C++ programs to demonstrate use of function overloading.	04
9.	Implementation of C++ programs to demonstrate use of virtual function.	04
10.	Implementation of C++ programs to demonstrate static data members, friend function.	04
11.	Implementation of C++ programs to demonstrate constructors and destructors.	04
12.	Implementation of C++ programs to use arrays and string.	06
13.	Implementation of C++ programs for type conversions.	04
14.	Implementation of file handling operations.	06
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication
C++: The Complete Reference	Herbert Schildt	McGraw-Hill Education

Reference Book(s):

Title	Author/s	Publication
Object Oriented Programming with C++	E Balagurusamy	McGraw Hill Education (India) Private Limited

Web Material Link(s):

- **https://www.tutorialspoint.com/cplusplus/index.htm**
- **https://www.w3schools.com/CPP/default.asp**
- **https://www.javatpoint.com/cpp-tutorial**

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation consists of the performance of practicals, which will be evaluated out of 10 per each practical. At the end of the semester, the 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.
- External viva consists of 30 marks.

Course Outcome(s):

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

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

SSCS1031	OBJECT-ORIENTED PROGRAMMING WITH C++
CO1	Use advanced features like templates and exceptions to make programs, standard template library for faster development.
CO2	Use features of c++ like type conversion, inheritance, polymorphism, i/o streams and files to develop programs for real life problems.
CO3	Develop the applications using object-oriented programming with c++.
CO4	Use advance features like temples and exception to make programs supporting reusability and template library for faster development.
CO5	Develop the applications using object-oriented programming with c++.

Mapping of CO with PO

SSCS1031	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2			1	2	2	1		1			1
CO 2		1	2	2	1	2	2		1			2
CO 3	2	1	1	1	2	2	2		2			1
CO 4	1	2	2	1	1	0	1		2			1
CO 5	2	3	2	2	3	2	3		2			2

Mapping of CO with PSO

SSCS1031	PSO1	PSO2	PSO3
CO 1	1		
CO 2	3		
CO 3	2	2	
CO 4	3	2	
CO 5	3	2	

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

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

Module No	Content	RBT Level
1	Basic concepts of Object-Oriented Programming	1,2
2	Functions in C++	2,3
3	Constructors and Destructors	1,2,3
4	Inheritance	1,2,3
5	Array & Strings	1,2
6	C++ Streams	2,3

SECOND YEAR B. SC. (IT)

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION															
TEACHING & EXAMINATION SCHEME FOR B.Sc.IT PROGRAMME with Provision of Honors (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**	
3	SSCA2022	Core Java	CA	03	04	-	07	05	40	60	40	60	-	-	200
	SSCA2031	Web Application Design & Development-II	CA	01	04	-	05	03	00	00	100	00	-	-	100
	SSCS2010	Computer Networks	CS	03	02	-	05	04	40	60	40	60	-	-	200
	SSCS2020	Digital Marketing	CS	03	02	-	05	04	40	60	40	60	-	-	200
	SSCS2030	Software Lab	CS	-	04	-	04	02	-	-	100	00	-	-	100
	CLSC2020	IPDC-I	CLSC	02	-	-	02	02	100	00	-	-	-	-	100
						Total	**28**	**20**							**900**
4	SSCA2050	Mobile Application Development	CA	03	04	-	07	05	40	60	40	60	-	-	200
	SSCS2041	Operating Systems	CS	03	02	-	05	04	40	60	40	60	-	-	200
	SSCS2051	Programming with Python	CS	03	04	-	07	05	40	60	40	60	-	-	200
	SSCS2061	Cryptography & Network Security	CS	03	02	-	05	04	40	60	40	60	-	-	200
	CLSC2030	IPDC-II	CLSC	02	-	-	02	02	100	00	-	-	-	-	100
		Elective - I	CA/CS	02	02	-	04	03	40	60	40	60	-	-	200
						Total	**30**	**24**							**1100**

P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION																
TEACHING & EXAMINATION SCHEME FOR B.Sc.IT PROGRAMME with Provision of Honors (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**		
	SSCA2511	Design & Analysis of Algorithms	CA	02	02	-	04	03	40	60	40	60	-	-	200	
	SSCA2521	Advance Java	CA	02	02	-	04	03	40	60	40	60	-	-	200	
	SSCS2510	Programming with .NET	CS	02	02	-	04	03	40	60	40	60	-	-	200	

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA2022
Course Name: Core Java
Prerequisite Course(s): -- SSCS1031 Object Oriented Programming with C++

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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s)of the Course:

To help learners to

- Understand basics of object-oriented programming.
- Identify appropriate approach to computational problems.
- Develop logic building and problem-solving skills.

Course Content:

SECTION I			
Module No.	**Content**	**Hours**	**Weightage in%**
1.	**Introduction:** Programming language Types and Paradigms, Flavors of Java, Java Designing Goal, Features of Java Language, JVM - The heart of Java, Java's Magic Bytecode.	03	05
2.	**Introduction to Debugging:** What is debugging, The debugging process, Basic Debugging in Java - Problem-solving strategies, Resources for debuggers, Debugging Tools - Documentation, Error messages, Debugging Techniques - Debugging with print statements, Debugging with comments and questions, Common Java Errors - What Type of Error?, Sy ntax errors, Runtime errors, Logic errors, Null Pointer Exception, Index Out Of Bounds Exception, Arithmetic Exception.	03	05
3.	**Object-Oriented Programming Fundamentals:** Class Fundamentals, Object and Object reference, Object Life time and Garbage Collection, Constructor and initialization code block, Access Control, Modifiers, Nested class, Inner Class, Anonymous Classes, Abstract Class and Interfaces, Defining Methods, Method Overloading, Dealing with Static Members, Use of "this" reference, Use of Modifiers with Classes & Methods, Generic Class Types.	06	15

4.	**Java Environment and Data Types:** The Java Environment: Java Program Development, Java Source File Structure, Compilation, Executions, Identifiers, Keywords, Literals, Comments, Primitive Data-types, Operators.	04	10
5.	**Class and Inheritance:** Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data Members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, Use of "super", Polymorphism in inheritance, Type Compatibility and Conversion.	07	15
Section II			
Module No.	**Content**	**Hours**	**Weightage in%**
6.	**Array and String Concepts:** Defining an Array, Initializing & Accessing Array, Multi-Dimensional Array, Operation on String, Using Collection Based Loop for String, tokenizing a String, Creating Strings using String Buffer.	06	15
7.	**Exception Handling:** The Idea behind Exception, Exceptions & Errors, Types of Exception, Control Flow in Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User-Defined Exceptions, Checked and Un-Checked Exceptions.	07	15
8.	**Thread:** Understanding Threads, Needs of Multi-Threaded Programming, Thread Life Cycle, Thread Priorities, Synchronizing Threads, Inter-Communication of Threads.	06	15
9.	**Java Packages:** Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import, Naming Convention for Packages.	03	5
	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.	04
3.	Implement Java programs showing usage of overloading and overriding.	02
4.	Implementation of Java programs to demonstrate different access specifiers.	04
5.	Implementation of Java programs using the concept of inner classes.	04
6.	Implementation of Java programs for variables, data types, and operators.	04
7.	Implement Java programs for inheritance (single, multilevel, hierarchical).	04

8.	Implementation of Java programs to demonstrate the use of the super keyword.	02
9.	Implementation of Java programs for anonymous and abstract classes.	02
10.	Implementation of Java programs for interfaces.	02
11.	Implementation of Java programs to demonstrate Java packages.	02
12.	Implementation of Java programs to use arrays and strings.	06
13.	Implementation of Java programs for exception handling using all keywords.	06
14.	Implementation of Java programs to demonstrate the lifecycle of a thread.	04
15.	Implementation of Java programs for the concepts of thread priority, synchronization, and inter-thread communication.	06
16.	Implementation of file handling operations.	06
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication
Core Java Volume I–Fundamentals	Cay Horstmann and Gray Cornell	Pearson

Reference Book(s):

Title	Author/s	Publication
Thinking in Java	Bruce Eckel	Pearson
Learning Java	Patrick Niemeyer and Jonathan Knudsen	O'reilly Media

Web Material Link (s):

- https://www.programiz.com/java-programming
- https://www.tutorialspoint.com/java
- https://www.geeksforgeeks.org/java-programming-basics/
- https://nptel.ac.in/noc/individual_course.php?id=noc19-cs07

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the average of the entire practical will be converted to 20marks.
- Internalvivaconsistsof20marks.
- Practical performance/quiz/testconsistsof30marks.
- External viva consists of 30marks.

Course Outcome(s):

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

SSCA2022	CORE JAVA
CO 1	Learn and acquire principles of object-oriented programming concepts and its application using java programming.
CO 2	Identify syntax, semantics, data types, conditional statements, control structures, and arrays and strings in java programming language.
CO 3	Explain building blocks of java environment, concept of polymorphism, inheritance, abstraction and interfaces and construct programs in java.
CO 4	Define and describe the role of packages and exception handling for access protection, name space management and reliability of code.
CO 5	Recognize and implement multithreading for exploring concurrency and applets for basic graphical user interface in java.

Mapping of CO with PO

SSCA2022	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2	1	2							1
CO 2	2	2	2	2	1				2	1		1
CO 3	2	2	3	3	3				3	1		1
CO 4	1	2	2	2	2		1		1	1		1
CO 5	1	2	3	2	3				2	2	1	

Mapping of CO with PSO

SSCA2022	PSO1	PSO2	PSO3
CO 1	1	1	1
CO 2	2	2	1
CO 3	2	3	1
CO 4	2	3	1
CO 5	1	3	1

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

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

Module No	Content	RBT Level
1	Introduction	1, 2, 3
2	Introduction to Debugging	1, 2
3	Object Oriented Programming Fundamentals	1, 2, 3, 4
4	Java Environment and Datatypes	1, 2, 3, 4
5	Class and Inheritance	1, 2, 3
6	Array and String Concepts	1, 2, 3
7	Exception Handling	1, 2, 3
8	Thread	1, 2, 3
9	Java Packages	1, 2, 3, 4, 5

P P Savani University
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Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA2031
Course Name: Web Application Design & Development-II
Prerequisite Course(s): -- SSCA1010 Web Application Design & Development-I

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
01	04	-	03	-	-	100	00	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Gain the PHP programming skills needed to successfully build interactive, data-driven sites.
- Understand how server-side programming works on the web.
- Connect to any modern database and perform hands on practice with a MySQL database to create database-driven HTML forms and reports.

Course Content:

SECTION I			
Module No.	**Content**	**Hours**	**Weightage in%**
1.	**Introduction to PHP** Loosely typed language vs. Strongly Typed Language What is PHP? - Basic PHP Syntax, Comments in PHP, Error Management	01	05
2.	**Constants, Variables, and Data Types:** Constants, Variables, and Data Types: Keyword, Constants, and Variables. Data types cover declaration and initialization, basic input and output operations, and symbolic constants.	01	10
3.	**Operators and Expressions:** Operators and Expressions cover Arithmetic Operator, Increment and Decrement Operator, Assignment Operator, and String Operator.	02	10
4.	**Conditional Statements and Branching:** Conditional Statements and Branching encompass Decision Making & Branching such as Decision making with If & If...Else statements and If - Else statements (Nested Ladder). Looping includes The while statement, The break statement, The Do-While loop, The FOR loop,	03	25

	FOREACH, break, and continue.		
SECTION II			
Module No.	Content	Hours	Weightage in%
5.	**User-Defined Functions:** Prototypes, definition of function, parameters, parameter passing, calling a function, recursive function, in-built functions	01	10
6.	**Arrays and Strings:** Introduction to array, Numeric Array, Associative Array, and Multi-dimensional Array, in-built string functions	02	10
7.	**PHP Forms:** $_GET and $_POST function	02	10
8.	**Database Connectivity in PHP:** Introduction to Databases and SQL,Connecting to MySQL Database, Executing SQL Queries, Retrieving and Manipulating Data	03	20
	TOTAL	**15**	**100**

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Hello World Example, finding errors present in the program, Insert Comments in Program, PHP Variable Example, Global and locally-scoped variables – Example, Constant string Example, PHP Example to calculate the area of the circle	5
2.	Static Keyword in PHP – Example, ECHO and PRINT statements in PHP – Example, strlen() and strpos() functions – Example	5
3.	Example on Arithmetic Operators, Increment and Decrement Operators, Assignment Operators and String Operators	6
4.	Example on Conditional Statements (if, if…else Statement, if…elseif…else and Switch)	5
5.	Example on branching Statements (For loop, Declaring multiple variables in for loop, While loop and Do While loop), Example on break and Continue Statement	6
6.	User Defined Function Example (How to Adding parameters and How to Return values?). Date() and time() function in PHP – Example	5
7.	Array in PHP Numeric array in PHP – Example, Associative array in PHP – Example, Loop through an Associative array Multidimensional array in PHP – Example	6
8.	PHP Forms The $_GET Function – Example The $_POST Function–Example PHP Global Variables–Super globals $_GLOBALS–Example $_SERVER–Example	6

9.	How to connect to MYSQL database using PHP - The functions used to connect web form to the MYSQL database - Display the data from MYSQL database in web form - Insert the data into MYSQL database using web form - Update the data present in MYSQL database using web form - Delete the data from MYSQL database using web form - Using Cookies with PHP	8
10.	A simple GUI-based web application development using PHP Finalization of topic Analysis of problem Design of GUI PHP Implementation Testing Final Evaluation	8
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication
Learning PHP ,MySQL	Michele Davis, Jon Phillips	'O'riley Press

Reference Book(s):

Title	Author/s	Publication
The Complete Reference PHP	Steven Holzner	TMH
Web Technologies Black Book	Kogent Learning Solutions Inc.	Dream tech PRESS

Web Material Link (s):

- https://www.w3schools.com/php/
- http://www.nptelvideos.com/php/php_video_tutorials.php

Course Evaluation:

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the average of the entire practical will be converted to 50 marks.
- Submission of project developed as per the guidelines of the course coordinator at the end of the Semester consists of 50 marks.

Course Outcome(s):

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

SSCA2031	Web Application Design & Development-II
CO 1	Describe the concepts of world wide web, and the requirements of effective web design.
CO 2	Conceptualize about advance web technology.

CO 3	Analyze a web project and identify its elements and attributes in comparison to traditional projects.
CO 4	Learn and explore structure of open-source technologies.
CO 5	Build web applications using PHP, xml documents and xml schema, and consume web services.

Mapping of CO with PO

SSCA2031	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1				2						1
CO 2			1		1				1			1
CO 3	1	2	1	2	1		1			1	1	1
CO 4		1			1	2				1		
CO 5	2	2	2	1	2			1	3	1	1	

Mapping of CO with PSO

SSCA2031	PSO1	PSO2	PSO3
CO 1	1		
CO 2	1		1
CO 3	2	3	1
CO 4	1	1	1
CO 5	3	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	Introduction to PHP	1, 2, 3
2	Constants, Variables and datatypes	1, 2, 3, 4
3	Operators and Expression	1, 2, 3, 4
4	Conditional statement and branching	1, 2, 3
5	User-Defined Functions	1, 2, 3
6	Arrays and Strings	1, 2, 3
7	PHP Forms	1, 2, 3
8	Data-base connectivity in PHP	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS2010
Course Name: Computer Networks
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s)of the Course:

To help learners to

- understand the concept of data communication.
- understand the concepts and layers of OSI and TCP-IP reference models.
- get familiar with different protocols and network components.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Introduction** Overview of Network and Data Communications, Data Communications, Computer Networking, Protocols and Standards, types of Network, Network Topology, Protocol hierarchies, and design issues of layers, Interfaces, and services. Reference Model: The OSI reference model, TCP/IP reference model, Network Standards.	05	10
2.	**Physical Layer** Data and transmission techniques, Multiplexing, Transmission media, Asynchronous Communication, Wireless transmission.	06	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.	07	15
4.	**Medium Access Sub Layer** Channel Allocations, Multiple Access protocols- ALOHA, CSMA, CSMA/CD protocols, LAN architectures, IEEE 802, OSI, Ethernet (CSMA/CD).	05	10

Section II			
Module No.	Content	Hours	Weightage in%
5.	**Network Layer** A network Layer design issue, Routing algorithms and protocols, Congestion Control Algorithms, Internetworking, Addressing, N/W Layer Protocols and recent developments.	08	26
6.	**Transport Layer** Transport services, Design issues, transport layer protocols, Congestion Control, QOS and its improvement.	06	12
7.	**Application Layer** Client-Server Model, DNS, SMTP, FTP, HTTP, WWW, and recent development.	08	12
	TOTAL	**45**	**100**

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Implement Packet Generation having information of packet number (2-dig), Total no of packets (2 dig) & data itself in the packet.	08
2.	Implementation flow control algorithms, CRC, VRC, LRC.	06
3.	Implement CSMA/CD between two machines.	06
4.	Implement Token ring between 3 machines.	06
5.	Study of switches, Hubs, Routers, and gateway.	04
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Data Communication and Networking	Behrouz A. Forouzan	Tata Mc GrawHill

Reference Book(s):

Title	Author/s	Publication
Computer Networks	Andrew S Tanenbaum	PHI Learning
Data and Computer Communication	William Stallings	Prentice Hall

Web Material Link (s):

- http://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm\
- https://nptel.ac.in/courses/106105080/
- https://www.cisco.com/c/en_in/training-events/training-certifications/certifications.html

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and averageof 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:

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

Course Outcome(s):

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

SSCS2010	COMPUTER NETWORKS
CO 1	Distinguish the working of network protocols, application and OSI reference model and TCP/IP reference model.
CO 2	Explain various service provided by computer network and its uses.
CO 3	Describe concept of network interface and performance issues in the networks.
CO 4	Evaluate network tools for implementing network protocols.

Mapping of CO with PO

SSCS2010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	2	3	3	3	2			3		1
CO 2		3	3	2	3	2	3			3		2
CO 3	1	3	2	3	3	3	3			2		3
CO 4	1	3	3	3	3	3	2			2		3

Mapping of CO with PSO

SSCS2010	PSO1	PSO2	PSO3
CO 1	2	3	3
CO 2	3	3	2
CO 3	3	3	3
CO 4	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	1, 2, 3
2	Physical Layer	1, 2, 3, 4
3	Data Link Layer	1, 2, 3, 4
4	Medium Access Sub Layer	1, 2, 3
5	Network Layer	1, 2, 3

6	Transport Layer	1, 2, 3
7	Application Layer	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS2020
Course Name: Digital Marketing
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 Digital Marketing as an effective marketing mix element for marketing productsand services for new enterprise and startups.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Introduction to Digital Marketing** - Introduction and Strategic Setup - Digital Marketing from traditional to modern era - Opportunities and Challenges - Role of Internet and its Current trends - Implications for business & society - Emergence of digital marketing as a tool - Drivers of the new marketing environment - Digital Marketing Framework & Models	07	15
2.	**Digital Marketing Mix** -Search Engine Advertising -Pay for Search Advertisements -Ad Placement, Rank -Creating and Enhancing Ad Campaigns -Evaluating Campaigns	08	15

3.	**Content Marketing** Content Marketing Concepts & Strategies; Planning, Creating, Distributing & Promoting Content; Optimize Website UX & Landing Pages; Measure Impact; Metrics & Performance; Using Content Research for Opportunities	07	20
	Section II		
Module No.	Content	Hours	Weightage in%
4.	**Display Marketing** - Display Ads – Concepts and Types - Buying Models (CPC, CPM, CPL, CPA) - Targeting Display Ads - Programmable Digital Marketing - Analytical Tools - YouTube marketing	08	15
5.	**Social media metrics** - Mobile Advertising, - Forms of Mobile Marketing & Features - Mobile Campaign Development - Mobile Advertising Analytics - Google Analytics & Google AdWords - Data collection for web analytics - Multichannel attribution - Universal analytics and Tracking	07	15
6.	**Search Engine Optimization** Search Engine Optimization Fundamentals; Keywords and SEO Content Plan; SEO & Business Objectives; Writing SEO Content; On-site & off-site SEO; Optimize Organic Search Ranking **Web Analytics & Google Analytics** Google Analytics Tools; Web Analytics Tools	08	20
	TOTAL	**45**	**100**

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Practical Task: Develop a digital marketing strategy for a fictional business, outlining goals, target audience, and key performance indicators (KPIs).	02
2.	Compare a traditional marketing campaign with a digital marketing campaign. Analyze the differences in reach, cost, and audience engagement.	02
3.	Conduct a SWOT analysis for a business considering digital marketing. Identify potential opportunities and challenges in the digital landscape.	02
4.	Research and present a case study on a brand that successfully leveraged current digital trends (e.g., influencer marketing, user-generated content).	02

5.	Explore and discuss the ethical considerations of digital marketing. Create guidelines for responsible and ethical marketing practices.	02
6.	Develop a timeline showcasing the evolution of digital marketing tools and technologies. Highlight key milestones and their impact.	02
7.	Analyze how technological advancements drive changes in consumer behavior. Propose strategies for adapting marketing efforts to these changes.	02
8.	Apply a digital marketing framework (e.g., RACE model) to a real-world scenario. Develop a campaign using the framework and measure its effectiveness.	02
9.	Set up a Google Ads campaign for a business. Choose relevant keywords, set a budget, and monitor campaign performance.	02
10.	Optimize a pay-per-click (PPC) campaign by adjusting bids, improving ad relevance, and implementing ad extensions.	02
11.	Analyze the performance of a YouTube marketing campaign using YouTube Analytics. Identify trends and areas for optimization.	02
12.	Develop a location-based marketing strategy. Consider features like push notifications or mobile wallet integration to enhance user experience.	02
13.	Use mobile advertising analytics tools to track user engagement and conversion rates. Adjust the campaign based on the insights gained.	02
14.	Implement tracking codes and tags for a website using Google Analytics. Verify the accuracy of data collection.	02
15.	Analyze a marketing campaign using a multichannel attribution model. Determine the contribution of each channel to conversions.	02
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Digital Marketing	Seema Gupta	Mc-GrawHill,1st Edition – 2017
Fundamentals of Digital Marketing	Puneet Singh Bhatia	Pearson1stEdition-2017

Reference Book(s):

Title	Author/s	Publication
The Art of Digital Marketing	Ian Dodson	Wiley

Web Material Link (s):

- https://www.springer.com/cda/content/document/cda.../9783319282794-c2.pdf
- https://neilpatel.com/what-is-digital-marketing/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and averageof 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:

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

Course Outcome(s):

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

SSCS2020	DIGITAL MARKETING
CO 1	Perform search engine optimization using google analytics tools.
CO 2	Develop marketing models using digital marketing strategies in tutorial.
CO 3	Analyze and understand a business's productivity using marketing metrics.
CO 4	Understand and predict performance of a company using porter's point analysis.
CO 5	Write a blog describing their personal family business or hypothetical business using online tools.

Mapping of CO with PO

SSCS2020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	1		2	1	3	1			1	2	1
CO 2	2	2	2	2			2	1		1	1	
CO 3		2	1	1	1			1	1	1		2
CO 4	2	1	1	2	1			1	1	1		2
CO 5	2	2	2	1	1	2	2	1	1	1	2	1

Mapping of CO with PSO

SSCS2020	PSO1	PSO2	PSO3
CO 1	1	2	
CO 2			2
CO 3	1	2	1
CO 4	3		
CO 5	3	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	Introduction to Digital Marketing	1, 2, 3
2	Digital Marketing Mix	1, 2, 3, 4
3	Content Marketing	1, 2, 3, 4
4	Display Marketing	1, 2, 3

5	Social media metrics	2,3,4
6	Search Engine Optimization	2,3,4,6

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS2030
Course Name: Software Lab
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s)of the Course:

To help the learners to

- Learn new tools as percent trends in the industry.
- Develop small software modules.

Course Content:

Lab performances based on any one/two software development tools/programming languages from the list below:

1) Matlab
2) GNU Octave
3) Mathematica
4) SciLab
5) Weka
6) R programming language
7) UI/UX design software
8) Multi-media software tools
9) MongoDB
10) ADVANCED WEB TECHNOLOGIES - LAMP, JSP, Apache Web serverAny emerging tools/software based on industry requirement.

Course Evaluation:

Practical:

- Continuous Evaluation as per the guidelines of the course coordinator declared at the beginning of the semester which consists of 100 marks.

List of Practical(s):

Sr. No.	Name of Practical	Hours
1.	MATLAB: Implement a numerical integration algorithm to approximate the area under a curve.	06

2.	GNU Octave: Create a script to perform matrix operations such as addition, multiplication, and inversion.	06
3.	Mathematica: Generate a plot depicting the solution to a differential equation with specified initial conditions.	06
4.	SciLab: Develop a program to fit a polynomial curve to a set of data points using the least squares method.	06
5.	Weka: Use the software to analyze a dataset and classify instances using a decision tree algorithm.	06
6.	R programming language: Write a script to perform linear regression analysis on a dataset and interpret the results.	0
7.	UI/UX design software: Design a user interface prototype for a mobile application focusing on intuitive navigation and visual appeal.	06
8.	Multimedia software tools: Create a multimedia presentation incorporating images, videos, and audio elements on a chosen topic.	06
9.	MongoDB: Develop a database schema and implement CRUD (Create, Read, Update, Delete) operations for a simple web application.	06
10.	ADVANCED WEB TECHNOLOGIES - LAMP, JSP, Apache Web server: Configure a LAMP stack environment and deploy a dynamic website using JSP technology on an Apache web server.	06
	TOTAL	**60**

Course Outcome(s):

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

SSCS2030	**SOFTWARE LAB**
CO 1	Identify and compare various software tools to solve real world problems.
CO 2	Learn new tools as per recent trends to become more competent in the industry.
CO 3	Apply practical knowledge for software development of a real time application.
CO 4	Explore the technological advancements in the field of information technology.
CO 5	Associate with industrial experts through Coursera or Udemy to understand the trending technology in the field of computer science.

Mapping of CO with PO

SSCS2030	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	2			1	3							1
CO 2	1			2	3			1				1
CO 3	2			2	2		2					1
CO 4	2				3			1				1
CO 5			1		2							1

Mapping of CO with PSO

SSCS2030	PSO1	PSO2	PSO3
CO 1	1		2
CO 2	1		2
CO 3	1		2
CO 4	1		2

CO 5			2

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

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

Module No	**Content**	**RBT Level**
1	Software Tool	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA2050
Course Name: Mobile Application 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	
03	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s)of the Course:

To help the learners to

- understand life cycle of an application/activity.
- learn design of responsive mobile applications.
- develop mobile application using open-source technologies

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction of Android** Android Operating System, History of Mobile Software Development, Open Handset Alliance (OHA), The Android Platform, Installation, Android SDK, Command-Line Tools and the Android Emulator, Application Context, Application Tasks.	03	05
2.	**Android Application Design and Resource** Anatomy of an Android Application, Android Manifest file, Managing Application's Identity, Enforcing Application System Requirements, Registering Activities and other Application Components, Working with Permissions.	02	05
3.	**Exploring User Interface Screen Elements** Introducing Android Views, Layouts, TextView, Buttons, Check Boxes, Radio Groups, Indicators, SeekBar, Context Menus, User Events, Styles and Themes, Dates and Times, Retrieving Data.	05	16
4.	**Designing User Interfaces with Layouts** Creating User Interfaces in Android, View versus View Group, Layout Classes such as Fame Layout, Linear Layout, Relative Layout, Table Layout, Multiple Layouts on a Screen, Data- Driven Containers, Organizing Screens with Tabs, Scrolling Support.	03	16

5.	**Drawing and Working with Animation** Working with Canvases and Paints, Working with Text, Working with Bitmaps, Working with Shapes, Working with Animation.	02	08
	Section II		
Module No.	Content	Hours	Weightage in %
6.	**Android Storage APIs** Working with Application Preferences such as Creating Privateand Shared Preferences, Adding, Updating, and Deleting Preferences. Working with Files and Directories, Storing SQLiteDatabase such as Creating an SQLite Database, Creating, Updating, and Deleting Database Records, Closing and Deleting a SQLite Database.	05	15
7.	**Content Providers** Exploring Android's Content Providers, Modifying Content Providers Data, Enhancing Applications using Content Providers, acting as a Content Provider, Working with Live Folders.	03	10
8.	**Networking, Web and Multimedia APIs** Understanding Mobile Networking Fundamentals, Accessing the Internet (HTTP), Browsing the Web with WebView,Building Web Extensions using WebKit, Working with Flash, Multimedia, Still Images, Video and Audio.	03	15
9.	**Telephony APIs** Working with Telephony Utilities, Using SMS, Making and Receiving Phone Calls, notifying a user, Notifying with Status Bar, Vibrating the Phone, Blinking the Lights, Making Noise, Customizing the Notification, Designing Useful Notification.	04	10
	TOTAL	**45**	**100**

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Create Hello World Application.	02
2.	Create log in application having validation of Email ID and Password.	02
3.	Create an application that will display toast (Message)on specific interval of Time.	02
4.	Create an UI such that, one screen has 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
5.	Create an application that will change color of the screen, based on selected Options from the menu.	04

6.	Create an application with UI components: Image Button, Toggle Button, Progress Bar.	04
7.	Create an application with UI components: Spinner, Date Picker, Time Picker, Seek Bar, Switch, Rating Bar.	08
8.	Using content providers and permissions, read phonebook contacts using Content providers and display in list.	04
9.	Create an app to send SMS and email.	04
10.	Database Connectivity.	04
11.	Create an application to perform operations on the database.	06
12.	Create an application that will play a media file from the memory card.	04
13.	Create application using Google speech API.	06
14.	Create application using Google maps API.	06
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication
Introduction to Android Application Development	Joseph Annuzzi Jr., Lauren Darcey, Shane Conder	Pearson Education

Reference Book(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and averageof 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:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical and the 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 Examination.
- Viva/Oral performance consists of 30 marks during End Semester Examination.

Course Outcome(s):

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

SSCA2050	MOBILE APPLICATION DEVELOPMENT

CO 1	Describe and differentiate various mobile technologies and mobile development platform.
CO 2	Identify how mobile application works along with its lifecycle and resources.
CO 3	Assess communication technologies into android applications.
CO 4	Design and implement application with user interface, use of apis for data storage.
CO 5	Develop user friendly android applications to solve real life computing problems.

Mapping of CO with PO

SSCA2050	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	3	3		2	1	2		2	2
CO 2	1	3	2	3	2		2		1	1	2	1
CO 3	3	2	2	2	3	2		1	2			1
CO 4	2	3	3	2	3	2		3	3		2	1
CO 5	2	3	2	2	2	2				2	2	

Mapping of CO with PSO

SSCA2050	PSO1	PSO2	PSO3
CO 1	3	3	2
CO 2	3	2	1
CO 3	3	2	3
CO 4	2	2	3
CO 5	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 of Android	1, 2, 3
2	Android Application Design and Resource	1, 2, 3, 4
3	Exploring User Interface Screen Elements	1, 2, 3, 4
4	Designing User Interfaces with Layouts	1, 2, 3
5	Drawing and Working with Animation	1, 2, 3, 4
6	Android Storage APIs	1, 2, 3, 4
7	Content Providers	1, 2, 3, 4
8	Networking, Web and Multimedia APIs	1, 2, 3, 4
9	Telephony APIs	1, 2, 3, 4

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS2041
Course Name: Operating Systems
Prerequisite Course(s): -- SSCA1020 Introduction to Computer Organization

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 principles of operating system design.
- understandarchitectureofcomputerbasedoperatingsystemsanditscomponents.
- Understand various software and hardware processes and its lifecycle.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Introduction** Introduction to OS, History of OS, Types and functions of OS.	02	06
2.	**Processes and Threads** Process Concept, Process State, Process Control Block, Threads,Types of Threads, Multithreading.	04	08
3.	**Inter-process Communication** Race Conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and Wakeup, Semaphores, Mutexes, Monitors, Message Passing, Barriers; CPU Scheduling: CPU-I/O burst cycle, Types of schedulers, Context switch, Pre-Emptive Scheduling, Dispatcher, Scheduling criteria; Scheduling algorithms: FCFS, SJF, Priority scheduling, Round-Robin scheduling.	12	26
4.	**Deadlocks** Resources, Conditions for Deadlocks, Deadlock modelling, The ostrich algorithm, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention, Other issues: Two-phase locking, Communication deadlocks, live locks, starvation.	04	10

Section II			
Module No.	Content	Hours	Weightage in%
5.	**Memory Management** Mainmemory:Background,Swapping,Contiguousmemoryallocation, Segmentation,Paging,Structureofpagetable,Virtual memory: Background, Demand paging, copy-on write, page replacement algorithms: Optimal page replacement, not recently used, FIFO, second chance page replacement, Cloak page replacement, LRU; Allocation of frames, Thrashing.	14	25
6.	**Input Output Management** Principles of I/O hardware: I/O devices, device controllers, memory mapped I/O, DMA, principles of I/O software: goals of I/O software.	06	15
7.	**File Systems** Introduction to Files: naming, structure, types, access, attributes, operations.	03	10
	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 and subtract numbers, find average, percentage. Also find factorial of a given number. Generate Fibonacci series etc.	04
4.	Simulate CPU scheduling algorithms (E.g. FCFS, SJF, Round Robin etc.).	06
5.	Simulate contiguous memory allocation techniques (E.g. Worst-fit, Best-fit, Next-fit, and First-fit).	04
6.	Simulate Banker's algorithm for deadlock avoidance.	04
7.	Simulate page replacement algorithms (E.g. FIFO, LRU, Optimal).	04
8.	Simulate disk scheduling algorithms (E.g. FCFS, SCAN, C-SCAN).	04
	TOTAL	**30**

Text Book(s):

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

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	Dhamdhere D. M	Tata McGraw Hill

Web Material Link (s):

- https://nptel.ac.in/courses/106108101/
- https://nptel.ac.in/courses/106106144/
- https://computer.howstuffworks.com/operating-system.htm
- https://www.tutorialspoint.com/computer_fundamentals/computer_operating_system.htm
- https://www.geeksforgeeks.org/operating-systems-need-and-functions/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and averageof 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:

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

Course Outcome(s):

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

SSCS2041	OPERATING SYSTEMS
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.
CO 4	Distinguish various operating system algorithms based on real life problems.
CO 5	Practice operating systems practical's using shell script in ubuntu.

Mapping of CO with PO

SSCS2041	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	3	3					1		1
CO 2	2	1	2	3	1					1		1
CO 3	1	1	1	2		2		1	1			
CO 4		1	1	1	1	2	3	1				
CO 5		2	3	3	3	3	2	3	2	2		

Mapping of CO with PSO

SSCS2041	PSO1	PSO2	PSO3
CO 1	3		1
CO 2	3	2	1
CO 3	1	1	1
CO 4	1		1
CO 5	1	3	1

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

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

Module No	Content	RBT Level
1	Introduction	1, 2, 3
2	Processes and Threads	1, 2, 3, 4
3	Inter-process Communication	1, 2, 3, 4
4	Deadlocks	1, 2, 3
5	Memory Management	1, 2, 3
6	Input Output Management	1, 2, 3
7	File Systems	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS2051
Course Name: Programming with Python
Prerequisite Course(s): -- SSCS1010 Introduction to Computer Programming

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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand importance of practical oriented approach.
- develop ability to implement real life programming problems.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Introduction to Python, History, Features and Applications ofPython, Python Input Output, Python basic Operators.	02	06
2.	**Python Data Types** Different Data Types in Python: Numeric, String and Sequential,Variables in Python.	06	04
3.	**Python Program Flow Control** Conditional blocks using if, else and else if, Simple for loops in Python, for loop using ranges, use of while loops in Python,Loop manipulation using pass, continue, break and else.	04	12
4.	**Python String, List, Tuple, Set and Dictionary Manipulation** String in Python and its built-in methods, List & Dictionary manipulation, Functions & methods for Tuple and Sets.	08	28
Section II			
Module No.	Content	Hours	Weightage in %

5.	**Python Functions Modules and Packages** Organizing Python codes using functions, organizing Python projects into Modules, importing own Module as well as external Modules, understanding Packages, Programming using functions, Modules and external packages.	05	16
6.	**Files in Python** Introduction to file input and output, Writing Data to a File,Reading Data from a File, using loops to process files.	07	06
7.	**Python Object Oriented Programming** Introduction to Oops Concept of class and its attributes, objects and instances, Inheritance and Polymorphism, Constructor and destructors, Python programming using OOP concepts.	06	22
8.	**Exception Handling in Python** Introduction to Exception and Errors, The Exception Handling mechanism in Python.	07	06
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Installation and Introduction to Python Environment.	02
2.	Learning Input and Output in Python.	02
3.	Working with different Data types in Python.	02
4.	Implementation of flow control statements.	04
5.	Implementation of Lists, Dictionaries, Sets, Tuples.	02
6.	Implementation of Strings in Python.	04
7.	Implementation of functions and Modules.	06
8.	Working with Packages and use different Packages available to work with Python	04
9.	Working with files in Python.	04
10.	Implementation of OOP features.	06
11.	Basics of Exception handling, Exception handling mechanism.	02
12.	SQL Database connection using Python, Creating and searching tables, Reading and storing information on database, Programming using database connections.	04
13.	**Python Regular Expressions** Email, URL validation and Pattern finding using regular expression.	06
14.	Developing mini application using Python.	12
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication
Learning to Program with Python	Richard L. Halter man	Pearson

Python Programming: A modular Approach	Sheetal Taneja, Naveen Kumar	Pearson

Reference Book(s):

Title	Author/s	Publication
Python Cookbook	David Ascher, Alex Martelli	O Reilly

Web Material Link (s):

- https://www.python.org/
- https://www.w3schools.com/python
- https://www.youtube.com/watch?v=rfscVS0vtbw
- https://www.youtube.com/watch?v=ayi5_yx61Zg

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and averageof 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:

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

Course Outcome(s):

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

SSCS2051	PROGRAMMING WITH PYTHON
CO 1	Understand data types, operators and functionalities by performing python practical.
CO 2	Apply the concepts of object-oriented programming language by developing user friendly programs.
CO 3	Understand the various aspects of application development by building python projects.
CO 4	Remember and implement the concepts of files and exception handling.
CO 5	Develop python projects using in built tools to solve computing problems in real world.

Mapping of CO with PO

SSCS2051	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2									
CO 2	3	3	2	1	2							
CO 3	3	3	2	2	3							
CO 4	2	2	2	2	2							

CO 5	2	2	3	2	3							

Mapping of CO with PSO

SSCS2051	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	3	2
CO 3	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	Introduction	1, 2, 3
2	Python Data Types	1, 2, 3, 4
3	Python Program Flow Control	1, 2, 3, 4
4	Python String, List, Tuple, Set and Dictionary Manipulation	1, 2, 3
5	Python Functions Modules and Packages	1, 2, 3
6	Files in Python	1, 2, 3
7	Python Object Oriented Programming	1, 2, 3
8	Exception Handling in Python	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS2061
Course Name: Cryptography & Network Security
Prerequisite Course(s): -- SSCS2010 Computer Networks

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- identify and classify various cybercrimes with respect to organizational weaknesses in orderto mitigate the security risk and estimate the impact on society and world.
- interpret and apply Indian IT laws in various legal issues.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Introduction to Cyber Security** Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats: - Cyber Warfare-Cyber Crime- Cyber Terrorism-Cyber Espionage, need for a Comprehensive Cyber Security Policy, need for a Nodal Authority, Need for an International convention on Cyberspace	05	10
2.	**Cyber Security Vulnerabilities and Cyber Security Safeguards** Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics,Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management	07	20

3.	**Securing Web Application, Services and Servers** Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges	06	10
4.	**Intrusion Detection and Prevention** Intrusion, Physical Theft, Abuse of Privileges, UnauthorizedAccess by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation	07	10
	Section II		
Module No.	**Content**	**Hours**	**Weightage In%**
5.	**Cryptography and Network Security** Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls-Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP andS/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec	07	20
6.	**Cyberspace and the Law** Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013	07	20
7.	**Cyber Forensics** Introduction to Cyber Forensics, Handling Preliminary analysis, Investigating Investigations, Controlling an Investigation, conducting disk-based Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time	06	10
	TOTAL	**45**	**100**

List of Practical:

Sr No	Name of Practical	Hours
1.	TCP scanning using NMAP	02
2.	Port scanning using NMAP	02
3.	TCP / UDP connectivity using Netcat	02
4.	Network vulnerability using OpenVAS	04
5.	Web application testing using DVWA	02

6.	Manual SQL injection using DVWA	04
7.	XSS using DVWA	04
8.	Automated SQL injection with SqlMap	04
9.	Design based Problems (DP)/Open Ended Problem:	06
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Cybersecurity for Beginners	RaefMeeuwisse	Cyber Simplicity Ltd

Reference Book(s):

Title	Author/s	Publication
Cyber Security	Nina Godbole, Sunit Belapure	Wiley India, New Delhi
Anti-Hacker Tool Kit,4th Edition	Mike Shema	McGrawHill Publication
The Indian Cyber Law	Suresh T. Vishwanathan;	Bharat Law House New Delhi
Handbook of Applied Cryptography	Menezes, van Oorschot and Vanstone	CRC Press
Computer Security, 3/e	Gollmann	Wiley

Web Material Link (s):

- https://nptel.ac.in/courses/106105031/
- https://www.javatpoint.com/cyber-security-tutorial

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SSCS2061	**CRYPTOGRAPHY & NETWORK SECURITY**

CO1	Understand cryptography theories, algorithms and security services.
CO2	Apply the knowledge of various cryptographic algorithms to secure information.
CO3	Distinguish various cryptographic techniques based on real life problems.
CO4	Analyze various network security threats and its counter measures in computer network.

Mapping of CO with PO

SSCS2061	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1	1	2	1					1	1	
CO 2	3	1	1	1		2	1				1	
CO 3		1	1	1	1						1	
CO 4	2	1	1	1								

Mapping of CO with PSO

SSCS2061	PSO1	PSO2	PSO3
CO 1	1	2	1
CO 2	1	2	2
CO 3		1	1
CO 4	1	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 Cyber Security	1, 2, 3
2	Cyber Security Vulnerabilities and Cyber Security Safe guards	1, 2, 3, 4
3	Securing Web Application, Services and Servers	1, 2, 3, 4
4	Intrusion Detection and Prevention	1, 2, 3
5	Cryptography and Network Security	1, 2, 3
6	Cyberspace and the Law	1, 2, 3
7	Cyber Forensics	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA2511
Course Name: Design & Analysis of Algorithms
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand how to calculate time complexity and space complexity of any algorithm.
- learn to optimize programmatic aspect to solve real-time problems.

Course Content

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Fundamental concept of Algorithm Design & Analysis** Algorithm: characteristics, specifications, Writing Pseudo- Code, Analysis of an algorithm, Asymptotic Notations: Time complexity & Space complexity of an algorithm, Big 'O'& 'Ω'notations, Best, Worst and Average case analysis of an algorithm, Analysis of sequential searching algorithms and sorting methods: bubble, insertion, selection, heap sort.	06	20
2.	**Divide and Conquer Algorithmic Design Method** Divide and conquer: basic algorithm and characteristics, BinarySearch: method and analysis, Matrix Multiplication.	04	15
3.	**Greedy Method** The Greedy Method: basic algorithm and characteristics, Fractional Knapsack Problem solving using greedy method.	05	15
Section II			
Module No.	Content	Hours	Weightage in %

4.	**Dynamic Programming Method** Dynamic Programming Method: basic algorithm and characteristics, 0/1 Knapsack Problem solving using DP method, Multistage graphs, Optimal binary search trees, Travelling salesperson problem.	06	18
5.	**Branch and Bound technique** Branch and bound: basic algorithm and characteristics, solving 4-queens, 8-queens, n-queens using branch & bound.	06	18
6.	**Hashing** The Symbol Table Abstract Data Types, Hash Tables, Hashing Functions, Hash collision Resolution Technique, Linear Probing.	03	14
	TOTAL	**30**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Implementation and Time analysis of Bubble sort.	02
2.	Implementation and Time analysis of Selection sort.	02
3.	Implementation and Time analysis of Insertion sort.	02
4.	Implementation and Time analysis of Merge sort.	02
5.	Implementation and Time analysis of Quick sort.	02
6.	Implementation and Time analysis of searching algorithm.	04
7.	Implementation of a dynamic programming.	04
8.	Implementation of shortest path algorithm.	02
9.	Implementation of graph traversal technique.	02
10.	Implementation of Minimum cost spanning tree.	02
11.	Implementation of backtracking.	02
12.	Implementation of greedy algorithm.	04
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Fundamentals of computer algorithms	Ellis Horowitz, Sarataj Sahni, S. Rajasekaran	Universities Press
Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein	PHI

Reference Book(s):

Title	Author/s	Publication
Design and Analysis of Algorithms	S. Sridhar	Oxford Higher Education
Algorithm Design	Michael Goodrich, Roberto Tamassia	Wiley Student Edition

Web Material Link (s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and averageof 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:

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

Course Outcome(s):

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

SSCA2511	**DESIGN & ANALYSIS OF ALGORITHMS**
CO 1	Get familiar with the concepts and usage of data types, dynamic memory management and data structures. demonstrate stack and queues algorithms.
CO 2	Demonstrate linked list data structures and its real world applications.
CO 3	Demonstrate graphs data structures and its real world applications.
CO 4	Demonstrate tree and sorting algorithms in data structures and its real world applications.
CO 5	Apply the concepts of dynamic programming and greedy approach in solving real life problems.

Mapping of CO with PO

SSCA2511	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	1	1	1	1							
CO 2	2	1	1	1	1							
CO 3	2	1	1	2	1					1		
CO 4	2	1	1	1	1							
CO 5	2	3	2	2	1	3	2	1		1		

Mapping of CO with PSO

SSCA2511	PSO1	PSO2	PSO3
CO 1		2	1
CO 2		2	1
CO 3		2	1
CO 4		2	1

CO 5	1	3	

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

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

Module No	**Content**	**RBT Level**
1	Fundamental concept of Algorithm Design & Analysis	1, 2, 3
2	Divide and Conquer Algorithmic Design Method	1, 2, 3, 4
3	Greedy Method	1, 2, 3, 4
4	Dynamic Programming Method	1, 2, 3
5	Branch and Bound technique	1, 2, 3
6	Hashing	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA2521
Course Name: Advance Java
Prerequisite Course(s): -- SSCA2022 Core Java

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand J2EE architecture.
- construct web application using servlets, Java Server pages.
- learn advanced java programming concepts like hibernate, Enterprise java beans, etc.

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**GUI Programming** Introducing Swing; Creating a Frame; Displaying Information in a Component; Working with 2D Shapes; Using Color; Using Special Fonts for Text; Displaying Images; Event Handling: Event Handling Basics, Event Classes, Event Listeners and Adapter Classes; Layout Management; Basic Swing Components	07	20
2.	**Servlets** Introduction, The Life Cycle of a Servlet; A Simple Servlet; The Servlet API; The javax. servlet Package; Reading Servlet Parameters; The javax. servlet. http Package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking	05	20
3.	**Server Response** Specifying Status Codes, HTTP / 1.1 Status Codes, Using Redirections, HTTP Response Headers: Setting Response Headers from Servlets, Understanding HTTP / 1.1 Response Headers, Using Servlets to Generate JPEG Images, Tracking	04	10

Section II			
4.	**Java Server Page (JSP)** Introduction to JSP, Understanding JSP, Describing the JSP Life Cycle, creating a Simple JSP pages, Working with JSP basic tags and Implicit objects, Action tags in JSP.	06	25
5.	**JDBC** The Design of JDBC: JDBC Driver Types and Typical Uses of JDBC; the Structured Query Language; JDBC Configuration; Working with JDBC Statements; Query Execution; Scrollable and Updatable Result Sets; Row Sets	08	25
	TOTAL	**30**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Study and implementation of servlet programming.	06
2.	Study and implementation of cookies and session management.	06
3.	Study and implementation of java server page.	06
4.	Study and implementation of java server page implicit objects.	04
5.	Study and implementation of java server page action tags.	02
6.	Study and implementation of java database connectivity.	06
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Complete Reference J2EE	James Keogh	Mc Graw Hill
"Core Servlets and Java Server Pages Volume – 2"	Marty Hall, Larry Brown, Yaakov Chaikin	Pearson Education
Java: The Complete Reference	Herbert Schildt	McGraw-Hill Education

Reference Book(s):

Title	Author/s	Publication
Core Java, Volume II: Advanced Features	Cay Horstmann and Gary Cornell	Pearson Publication
Java Server Pages	– Hans Bergsten,	SPD O'Reill

Web material link:

- https://www.javatpoint.com/servlet-tutorial/
- https://www.javatpoint.com/jsp-tutorial/
- http://docs.oracle.com/javaee/6/tutorial/doc/bnafd.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 the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the average of the entire practical will beconverted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Examination.
- Viva/Oral performance consists of 30 marks during End Semester Examination.

Course Outcome(s):

SSCA2521	ADVANCE JAVA
CO1	Learn and work with the web components of Java EE. i.e. the Servlet specification.
CO2	Develop dynamic web application using Java Servlet and Java Server Pages technology.
CO3	Implement the web-based applications using effective data base access with rich client interaction with jdbc.
CO4	Understand concepts related GUI Programming.

Mapping of CO with PO

SSCA2521	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	3		1				1	
CO2	2	2	2	2	2		1			1		1
CO3	3	2	2	2	2		1	1	1	2	2	2
CO4	3	2	1	2	2	2	1	1	1	2	2	1

Mapping of CO with PSO

SSCA2521	PSO1	PSO2	PSO3
CO 1	3	3	
CO 2	3	2	1
CO 3	2	2	2
CO 4	2	2	1

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

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

Module No	Content	RBT Level
1	GUI Programming	1,2,3
2	Servlets	2,3,6
3	Server Response	2,3,6

4	Java Server Page (JSP)	3,6
5	JDBC	2,3,6

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCS2510
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	
02	02	-	03	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand the .NET framework and its applications.
- Learn the basics of C#.
- ASP.NET web services and web service security.

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in%**
1.	**Introduction to .NET Framework** .NET Overview, NET framework, course mechanics, CLR, Assemblies (monolithic vs. component-based applications), Execution Model, Client-Side vs. Server-Side Programming.	05	16
2.	**Basics and Console Applications in C#** Name Spaces, Constructors, Destructors, Function Overloading, Inheritance, Operator Overloading, Modifier Properties, Indexers, Attributes, Reflection API, Console Applications, Generating Console Output, Processing Console Input.	05	16
3.	**C#.NET** Language Features and Creating .NET Projects, Namespaces Classes and Inheritance, Namespaces Classes and Inheritance, C, Exploring the Base Class Library, Debugging and Error Handling, Data Types, Exploring Assemblies and Namespaces, String Manipulation, Files and I/O, Collections.	05	18
Section II			

4.	**Windows Forms and Controls in details** The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus, Dialogs, Tool Tips, Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls.	04	14
5.	**ASP.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, Using the Complex Validators Accessing Data using ADO.NET, Using the Complex Validators Accessing Datausing ADO.NET, Configuration Overview, ASP.NET state management, tracing, caching, error handling, security, deployment.	04	12
6.	**Managing State** 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, Using Cookieless SessionIDs, Application State Using the DataList and Repeater Controls, Overview of List-Bound Controls, Creating a Repeater Control and DataList Control.	07	24
	TOTAL	**30**	**100**

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to .NET.	04
2.	Working with .NET and C#.	02
3.	Write C# code to convert infix notation to postfix notation.	02
4.	Write a C# code to convert the following currency conversion. Dollar to Rupee, Euro to Rupee, Pound to Rupee.	02
5.	Working with ASP.NET.	02
6.	Write a program to Enable-Disable Textbox and change the width of TextBox programmatically in ASP.NET.	02
7.	Write a program to increase and decrease the font size.	02
8.	Session and Cookie.	04
9.	Write ASP.NET program to Store Objects in Session State and Storing Session State in SQL Server.	04
10.	Write a C# code to Perform Celsius to Fahrenheit Conversion and Fahrenheit to Celsius conversion.	02
11.	Simple Object Access Protocol (SOAP) and Web Services.	04
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Professional C#4.0 and .Net 4	Christian Nagel, Bill Evjen, Jay Glynn, K. Watson, M. Skinner	Wrox Publication
C# The Basics	Vijay Mukhi	BPB Publications

Reference Book(s):

Title	Author/s	Publication
ASP.NET Complete Reference	Matthew Macdonald and Robert Standefer	McGraw Hill Education

Web Material Link (s):

- https://teamtreehouse.com/learn/csharp
- https://www.asp.net/aspnet/videos
- https://www.asp.net/web-forms/videos/aspnet-35

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration andaverage of the same will be converted to 30 marks.
- Faculty Evaluation consists of 10 marks as per guidelines provided by 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 per each practical. At the end of the semester, the average of the entire practical will beconverted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Examination.
- Viva/Oral performance consists of 30 marks during End Semester Examination.

Course Outcome(s):

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

SSCS2510	PROGRAMMING WITH .NET
CO1	Understand .net framework architecture, various tools, and validation techniques, use of different templates available in visual studio, implementation, and testing strategies in real time applications.
CO2	Understand the development and deployment cycles of enterprise applications.
CO3	Design .net software for problem solving.
CO4	Develop user friendly applications using asp .net to solve computing problems.

Mapping of CO with PO

SSCS2510	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

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

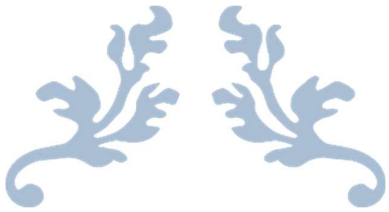
Mapping of CO with PSO

SSCS2510	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	3	2
CO 3	3	3	2
CO 4	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 .NET Framework	1, 2, 3
2	Basics and Console Applications in C#	1, 2, 3, 4
3	C#.NET	1, 2, 3, 4
4	Windows Forms and Controls in details	1, 2, 3
5	ASP.NET	1, 2, 3
6	Managing State	1, 2, 3



THIRD YEAR B. SC (IT)

P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION																
TEACHING & EXAMINATION SCHEME FOR B.Sc.IT PROGRAMME with Provision of Honors (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**	
5	SSCS3910	Project/Summer Internship	CS	-	04	-	00	04	-	-	100	00	-	-	100
	SSCA3021	Data Science	CA	03	04	-	07	05	40	60	40	60	-	-	200
	SSCS3010	Software Engineering	CS	03	-	01	04	04	40	60	-	-	100	00	200
	SSCS3021	Blockchain Technology	CS	03	04	-	07	05	40	60	40	60	-	-	200
	TNPC3010	Corporate Grooming & Etiquette	TNPC	03	-	-	03	03	100	-	-	-	-	-	100
		Life Skill Elective Course-I	CLSC	02	-		02	02	100	-	-	-	-	-	100
		Elective-II	CA/CS	02	02	-	04	03	40	60	40	60	-	-	200
						Total	**27**	**26**							**1100**
6	SSIT3570	Online Course	CS	03	-	-	03	03	100	-	-	-	-	-	100
		Life Skill Elective Course-I	CLSC	02	-		02	02	100	-	-	-	-	-	100
	SSCS3920	Project/Training	CS	-	17	-	17	17	-	-	200	300	-	-	500
						Total	**21**	**21**							**700**
						Grand Total	**157**	**135**							**5300**

P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION																
TEACHING & EXAMINATION SCHEME FOR B.Sc.IT PROGRAMME with Provision of Honors (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**		
5	Elective-II															
	SSCA3511	Cyber Security & Digital Forensic	CA	02	02	-	04	03	40	60	40	60	-	-	200	
	SSCA3520	Data Warehouse & Data Mining	CA	02	02	-	04	03	40	60	40	60	-	-	200	
	SSCS3512	Artificial Intelligence	CS	02	02	-	04	03	40	60	40	60	-	-	200	
	SSCS3520	Cloud Computing	CS	02	02	-	04	03	40	60	40	60	-	-	200	
	Life Skill Elective Course-I															
	CLSC2040	Life Skill Lessons from Bhagavad Gita	CLSC	02	-	-	02	02	100	00	-	-	-	-	100	
	CLSC2050	Learnings from Ramayana	CLSC	02	-	-	02	02	100	00	-	-	-	-	100	
	CLSC2060	Indian Heritage & Culture	CLSC	02	-	-	02	02	100	00	-	-	-	-	100	
	CLSC2070	Indian Classical Music	CLSC	01	02	-	03	02	50	00	50	00	-	-	100	
	CLSC2080	Indian Classical Dance	CLSC	01	02	-	03	02	50	00	50	00	-	-	100	
	CLSC2090	Constitutional Empowerment	CLSC	02	-	-	02	02	100	00	-	-	-	-	100	
	CLSC2100	Indian Agriculture	CLSC	01	02	-	03	02	50	00	50	00	-	-	100	
	CLSC2110	Indian Heath Science	CLSC	02	-	-	02	02	100	00	-	-	-	-	100	
	CLSC2120	Indian Architecture and Town Planning	CLSC	02	-	-	02	02	100	00	-	-	-	-	100	
6	Life Skill Elective Course-II															

	CLSC2140	Mindfulness & Well-being	CLSC	02	-	-	02	02	100	00	-	-	-	-	100
	CLSC2150	Culinary Life Skills	CLSC	01	02	-	03	02	50	00	50	00	-	-	100
	CLSC2160	Environmental Sustainability	CLSC	02	-	-	02	02	100	00	-	-	-	-	100
	CLSC2170	Cyber Space Awareness	CLSC	02	-	-	02	02	100	00	-	-	-	-	100
	CLSC2180	Essentials of Entrepreneurship	CLSC	02	-	-	02	02	100	00	-	-	-	-	100

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS3910
Course Name: Project/Summer Internship
Prerequisite Course(s): --

Teaching & Examination Scheme

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s)of the Course:

To help learners to

- identify, analyze and articulate projects with a comprehensive and systematic approach.
- Develop creative thinking.
- Develop Ability to solve problem
- Learn working in a team.

Outline of the Project/Summer Internship:

Sr. No.	Content
1.	**Selection of Project Title** After selecting the Project and proposed title, get approval from the Expert Panel
2.	**Literature Review / Requirement Analysis** Study in detail about the project definition chosen
3.	**System Design** Prepare the required documents in consultation with Mentor Introduction, Purpose, System Overview, System Design Constraints, Roles and Responsibilities, System Architecture, Database Design, System Security Controls, Project Reference
4.	**Implementation** Implementation of the project in any of the programming languages
5.	**Report Writing** The port must be prepared as per the suggested guidelines consisting, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure

6.	**Presentation Preparation** At the end of the semester, the student/group of students shall Give a presentation of their work followed by a viva-Voce examination

Course Evaluation:

Sr. No	Evaluation Criteria	Marks
1.	Selection of the topic (Within first 30 Days of commencement of Semester)	10
2.	Initial Presentation of the topic (Within 31to45 Days of commencement of semester)	10
3.	An actual work carried out. (Within 46 to 70 Days of commencement of semester)	40
4.	Report writing as per guidelines.	10
5.	Presentation & Question-Answer session.	30
	Grand Total	**100**

Course Outcome(s):

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

SSCS3910	PROJECT/Summer Internship
CO 1	Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
CO 2	Determine the challenges and future potential for his/her internship organization in particular and the sector in general.
CO 3	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
CO 4	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
CO 5	Analyze the functioning of internship organization and recommend changes for improvement in processes.

Mapping of CO with PO

SSCS3910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2	2	1	3		3	2	3	1	2
CO 2		2	2	3	3		3	1	3	2	3	2
CO 3	3	3	3	2	2	3	2	3	2	2	2	3
CO 4	1	3	2	2	3		2	3	3	2	3	3
CO 5	3	2	2	2	3	3	2	3	2	2	2	1

Mapping of CO with PSO

SSCS3910	PSO1	PSO2	PSO3
CO 1	1	2	
CO 2		1	1
CO 3			1

CO 4			2
CO 5	2	3	2

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA3021
Course Name: Data Science
Prerequisite Course(s): -SSCS2051 Programming with Python

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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- study fundamentals of data analytics and data science pipeline.
- apply statistical methods, regression techniques, and machine learning algorithms to make sense out of both large and small data sets.
- understand various Data Visualization techniques and their applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**An Introduction to core concepts & technologies** Introduction, Terminology, data science process, data science toolkit, Types of data, Examples and applications	06	10
2.	**Data collection and management** Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management,Using multiple data sources	07	15
3.	**Data analysis** Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes	09	25
Section II			
Module No.	Content	Hours	Weightage in%

4.	**Data visualization** Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings	09	25
5.	Applications of Data Science, Technologies for visualization, Bokeh (Python)	07	15
6.	Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods used in data science	07	10
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Basics of Python for Data Analysis • Why learn Python for data analysis? • Features provided in latest versions of Python • How to install Python? • Running a few simple programs in Python	06
2.	Python libraries and data structures • Python Data Structures • Python Iteration and Conditional Constructs • Python Libraries	08
3.	Exploratory analysis in Python using Pandas • Introduction to series and data frames • Analytics of dataset- Loan Prediction Problem	08
4.	Data Munging in Python using Pandas	06
5.	Building a Predictive Model in Python • Logistic Regression • Decision Tree • Random Forest	12
6.	Mini Project	20
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication
Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber and Jian Pei	Morgan Kaufmann
Doing Data Science: Straight Talk from the Frontline	Cathy O'Neil and Rachel Schutt	O'REILLY
Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data	EMC Education Services	Wiley

Reference Book(s):

Title	Author/s	Publication
Introduction to Data Science: Big data, machine learning, and more using Python tools	Arno D. B. Meysman Davy Cielen and Mohamed Ali	Manning Publications
The Data Science Handbook	Field Cady	Wiley
Data Science	John D. Kelleher and Brendan Tierney	MIT Press
Practical Data Science with R	Nina Zumel and John Mount	Manning Publication

Web Material Link (s):

- https://www.edureka.co/blog/what-is-data-science/
- https://www.analyticsvidhya.com/blog/2016/01/complete-tutorial-learn-data-science-python-scratch-2/
- https://www.ngdata.com/top-tools-for-data-scientists/
- https://towardsdatascience.com/intro-to-data-science-part-2-data-wrangling-75835b9129b4
- https://www.allerin.com/blog/top-5-sources-of-big-data
- https://www.tutorialspoint.com/excel_data_analysis/data_analysis_overview.htm
- https://www.tutorialspoint.com/statistics/data_collection.htm
- https://docs.bokeh.org/en/latest/

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.

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 Outcome(s):

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

SSCA3021	DATA SCIENCE
CO 1	Define the basic terminologies of data science.
CO 2	Examine knowledge of statistical data analysis utilized in business decision making.
CO 3	Recommend statistical methods for hypotheses testing and inference problem.
CO 4	Prepare data analysis-based solutions for real world business problems with help of data visualization.

CO 5	Demonstrate the best practice that presents your story in the process of creating data visualization including connecting to different data sources, assessing to the quality of the data, and converting raw data into data visualizations that provide actionable information.

Mapping of CO with PO

SSCA3021	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	2	2	3	3	2	2	2	2	2	
CO 2	3	3	2	2	2	3	1			2	2	
CO 3	2	3	3	3	3	3						
CO 4	2	2	3	2	3	2		1				1
CO 5	2	2	3	2	3	2		1	1			1

Mapping of CO with PSO

SSCA3021	PSO1	PSO2	PSO3
CO 1	2	2	2
CO 2	3	2	2
CO 3	3	3	3
CO 4	2	2	3
CO 5	2	2	3

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

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

Module No	Content	RBT Level
1	An Introduction to core concepts & technologies	1, 2, 3
2	Data collection and management	1, 2, 3, 4
3	Data analysis	1, 2, 3, 4
4	Data visualization	1, 2, 3
5	Applications	1, 2, 3, 4
6	Recent trends	1, 2, 3, 4

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS3010
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	00	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, process, criteria, strategies, and methods.
- discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- learn the process of improving the quality of software work products.
- gain the techniques and skills on how to use modern software testing tools to supportsoftware testing projects.
- expose Software Process Improvement and Reengineering.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Introduction to Software Engineering** Software & Types of Software, Software characteristics, Software Engineering – Introduction & Definition, Objective of Software Engineering, Generic View of Software Engineering, Software Engineering – A Layered Technology.	04	5
2.	**Software Process Models** Process Model – Introduction & Use, Types of Process Models – Waterfall, Prototype, Incremental and Spiral.	07	15
3.	**Requirements Engineering** Requirement – Definition, Types of Software Requirements, Requirement Engineering – Introduction & Process, Requirement	07	15

	Engineering Tasks, Requirement Gathering Techniques, Software Requirement Specification – Characteristics, Importance and Software Requirement Specification Document.		
4.	**System Design** System Design – Introduction, Design Model, Design Principle, Design Concepts, Design Model. Architectural Design Model.	05	15
Section II			
Module No.	Content	Hours	Weightage in%
5.	**User Interface Design** Concept of User Interface Design, Golden rules of User Interface Design, User Interface Design Model. Designing UI using UX Design.	04	10
6.	**System Analysis & Design Methodology** UML – Introduction, Use Case Diagram, Class Diagram, Data Flow Diagram, Data Dictionary	07	15
7.	**Software Testing** Testing Fundamentals, Concept of Errors Faults & Failures, Types of Testing - Black Box & White Box, Unit Testing, Integration Testing, System Testing, Performance Testing, Verification & Validation – Introduction.	06	15
8.	**Software Project Scheduling** Effort Estimation, Software Project Plan, Software Project Scheduling – Introduction & Process, Work Break Down Structure, Gantt Chart.	05	10
	TOTAL	**45**	**100**

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	To identify the role of the software in today's world across a few significant domains related to day-to-day life.	01
2.	To identify the problem related to software crisis for a given scenario.	01
3.	To identify the suitable software development model for the given scenario.	01
4.	To identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenarios.	01
5.	To identify the various elicitation techniques and their usage for the Banking case study.	01
6.	To classify the requirement into functional and non-functional requirements.	01
7.	Identify the elements in software Requirements Specification document.	01
8.	To verify the requirements against the quality attributes.	01
9.	Identify the elements and relationship by analyzing the class diagram of Shop Retail Application case study.	01
10.	Identify the design principle that is being violated in relation to the given scenario.	01

11.	To identify the usage of stubs or drivers in the context of an integration testing scenario.	01
12.	Identify the different types of performance testing.	01
13.	To identify the usage of regression testing.	01
14.	To understand usage of software metrics.	01
15.	Project Work: Understand importance of SDLC approach & various processes.	01
	TOTAL	**15**

Text Book(s):

Title	Author/s	Publication
Fundamentals of Software Engineering	Rajib Mall	PHI Learning
Software engineering: A Practitioner's Approach	Roger Pressman	McGraw Hill Education

Reference Book(s):

Title	Author/s	Publication
Software Engineering – An Engineering Approach	James F.Peters & Witold Pedrycz	Wiley
Software Engineering – Principles and Practice	Waman Jawadekar	McGraw Hill 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 out of 30 marks.
- Faculty Evaluation consists of 10 marks as per guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

- 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.
- 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 following course outcomes will be able to:

SSCS3010	SOFTWARE ENGINEERING
CO 1	Understand fundamentals of software development process.

CO 2	Ability to recognise user requirements and develop srs (software requirement specification) for effective software design.
CO 3	Analyse testing methods to ensure software quality as per different quality standards.
CO 4	Learn to apply knowledge of modern tools for efficient software project management.
CO 5	Identify various process models available for software engineering activities of software engineering like software requirements, software design, software construction, software management, and software quality etc.

Mapping of CO with PO

SSCS3010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	2	1			2		1	1	2	1
CO 2	2	1	2	1	2					1	1	
CO 3				2	2	2						
CO 4		1		2	3		1				2	1
CO 5	2	1	2	1	1					1		

Mapping of CO with PSO

SSCS3010	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	2	2	1
CO 3			
CO 4	1	1	1
CO 5	3	3	1

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

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

Module No	Content	RBT Level
1	Introduction to Software Engineering	1, 2, 3
2	Software Process Models	1, 2, 3, 4
3	Requirement Engineering	1, 2, 3, 4
4	System Design	1, 2, 3
5	User Interface Design	1, 2, 3
6	System Analysis & Design Methodology	1, 2, 3, 4,6
7	Software Testing	1, 2, 3, 4
8	Software Project Scheduling	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS3021
Course Name: Blockchain Technology
Prerequisite Course(s): - SSCS2010 Computer Networks

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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help the learners to
- understand blockchain and its applications.
- analyze IBM's strategy in blockchain platform.
- understand security in blockchain based networks.

Course Content:

Section I			
Module No	Content	Hours	Weightage in %
1.	**Introduction to Blockchain** Blockchain types, public key cryptography, Hashing, Digital Signature, Business networks, Assets, Ledgers, Transactions and Contracts, the problem with existing networks, how blockchain solves this problem, Requirements of a blockchain for business.	08	10
2.	**Blockchain Networks** Overview of active networks, TradeLens - Improving global trade, IBM Food Trust - Supply Chain Transparency, IBM World Wire - Global Payments, Decentralised and Trusted Identity, Further Examples by Industry, Key Players for Blockchain Adoption	07	20
3.	**IBM and Blockchain** How IBM can help with a Blockchain Project, IBM's Blockchain strategy, the IBM Blockchain Platform, The Linux Foundation's Hyperledger Project, Hyperledger Fabric, Continuing your Blockchain Journey	08	20

Section II			
Module No	Content	Hours	Weightage in %

4.	**Blockchain composed** What is Hyperledger Composer, Components and Structure of Composer, An example Business Network: Car Auction Market, Extensive, Familiar, Open Tool Set	06	10
5.	**Blockchain fabric development** Participants and Components Overview, Developer Considerations	08	20
6.	**Blockchain architecture** Administrator (operator) Considerations, Security: Public vs. Private Blockchains, Architect Considerations, Network Consensus Considerations	08	20
	TOTAL	**45**	**100**

List of Practical:

Sr No	Name of Practical	Hours
1.	Learn about popular blockchain applications. Create a list of those applications that are having impact on industries and business.	02
2.	Learn the concepts of consensus and mining in Blockchain through the Bitcoin network.	02
3.	Interpret the knowledge of the Bitcoin network, nodes, keys, wallets and transactions.	02
4.	Use an online service to generate hashes for content.	04
5.	Develop and implement a transaction and then hash it. Generate public and private keys. Digitally sign a transaction.	04
6.	Understand permissioned Blockchain and explore Hyperledger Fabric.	04
7.	Demo - Vehicle Lifecycle Demo: Transfer assets in blockchain	06
8.	Demo of Hyperledger Composer	06
9.	Create a Hyperledger Composer solution	06
10.	Develop applications in permissioned Hyperledger Fabric network.	06
11.	Write your first blockchain application	06
12.	Build your own network	06
13.	Implement a block chain application to exhibit implementation of your own crypto currency.	06
	TOTAL	**60**

Text Book:

Title	Author/s	Publication
Blockchain Basics – A Non-Technical Introduction in 25 Steps.	Daniel Drescher	A press

Reference Book:

Title	Author/s	Publication
Mastering Blockchain	Imran Bashir	Packt
The Business Blockchain – Promise, practice, and application of the next internet technology.	William Moujky; kgayar	Wiley

Web Material Link(s):

- https://www.udemy.com/course/blockchain-and-bitcoin-fundamentals/

- https://cognitiveclass.ai/courses/blockchain-course
- https://www.coursera.org/courses?query=blockchain

Course Evaluation:

Theory:

- Continuous Evaluation Consists of Two Tests; evaluation of each test consists of 15 marks. The duration of each test is 60 minutes.
- Students have to appear for a quiz/group discussion, which consists of 10 marks.
- End Semester Examination will consist of 60 Marks.

Practical:

- Continuous Evaluation consists of performance of practical, which should 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 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

SSCS3021	**BLOCKCHAIN TECHNOLOGY**
CO1	Analyse the importance of blockchain in several industries by performing extensive case studies.
CO2	Construct blockchain based applications with the help of different frameworks and tools.
CO3	Design cryptocurrency related applications by utilizing blockchain technology concepts.
CO4	Evaluate the performance metrics of blockchain applications using python based analytics.

Mapping of CO with PO

SSCS3021	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	2	1	1	2	1						3	
CO 2	1	2	3	2	3	2					1	
CO 3	2	2	2	2	2	2					2	
CO 4	2	2	3	3	3						2	

Mapping of CO with PSO

SSCS3021	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	1	2	2
CO 3	1	2	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 Blockchain	1,2,4
2	Blockchain Networks	2,3,4
3	IBM & Blockchain	2,4,5
4	Blockchain Composed	1,3,6
5	Blockchain fabric development	2,6
6	Blockchain architecture	1,2,3,6

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA3511
Course Name: Cyber Security & Digital Forensic
Prerequisite Course(s): - SSCS2010 Computer Networks

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

- identify and classify various cybercrimes with respect to organizational weaknesses in orderto mitigate the security risk and estimate the impact on society and world.
- interpret and apply Indian IT laws in various legal issues.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Introduction to Cyber Security** Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats: - Cyber Warfare-Cyber Crime- Cyber Terrorism-Cyber Espionage, need for a Comprehensive Cyber Security Policy, need for a Nodal Authority, Need for an International convention on Cyberspace	05	10
2.	**Cyber Security Vulnerabilities and Cyber Security Safeguards** Cyber Security Vulnerabilities-Overview, vulnerabilities insoftware, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, PoorCyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management	05	20

3.	**Securing Web Application, Services and Servers** Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges	02	10
4.	**Intrusion Detection and Prevention** Intrusion, Physical Theft, Abuse of Privileges, UnauthorizedAccess by Outsider, Malware infection, Intrusion detection andPrevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation	03	10
	Section II		
Module No.	Content	Hours	Weightage In%
5.	**Cryptography and Network Security** Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls-Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec	05	20
6.	**Cyberspace and the Law** Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013	05	20
7.	**Cyber Forensics & Digital Forensics** Introduction to Cyber Forensics, Handling Preliminary analysis, Investigating Investigations, Controlling anInvestigation, conducting disk-based Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time	05	10
	TOTAL	**30**	**100**

List of Practical:

Sr No	Name of Practical	Hours
1.	TCP scanning using NMAP	2
2.	Port scanning using NMAP	2
3.	TCP / UDP connectivity using Netcat	2
4.	Network vulnerability using OpenVAS	4
5.	Web application testing using DVWA	2
6.	Manual SQL injection using DVWA	4

7.	XSS using DVWA	4
8.	Automated SQL injection with SqlMap	4
9.	Design based Problems (DP)/Open Ended Problem:	6
	TOTAL	**30**

Text Book(s):

Title	Author/s	Publication
Cybersecurity for Beginners	RaefMeeuwisse	Cyber Simplicity Ltd

Reference Book(s):

Title	Author/s	Publication
Cyber Security	Nina Godbole, SunitBelapure	Wiley India, New Delhi
Anti-Hacker Tool Kit,4th Edition	Mike Shema	McGrawHill Publication
The Indian Cyber Law	Suresh T. Vishwanathan;	Bharat Law House New Delhi
Handbook of Applied Cryptography	Menezes, van Oorschot and Vanstone	CRC Press
Computer Security, 3/e	Gollmann	Wiley

Web Material Link (s):

- https://nptel.ac.in/courses/106105031/
- https://www.javatpoint.com/cyber-security-tutorial

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

SSCA3511	CYBER SECURITY & DIGITAL FORENSIC
CO1	Study different tools used in penetration testing.
CO2	Study and understand cyber laws
CO3	Implement necessary approaches and techniques to build protection mechanisms in order to secure information and computer networks.
CO4	Understand & employ the knowledge of advanced security technologies, laws to ensure security.

Mapping of CO with PO

SSCA3511	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1		3	3	3	2			2	3	2
CO 2	2	3	2	3	3		1			1	1	2
CO 3	3	3	2	2	2	2	1			2	2	1
CO 4	3	3	2	2	3	3	1			2		3

Mapping of CO with PSO

SSCA3511	PSO1	PSO2	PSO3
CO 1	2	3	2
CO 2	2	2	3
CO 3	1	2	2
CO 4	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	Introduction to Cyber Security	1, 2, 3
2	Cyber Security Vulnerabilities and Cyber Security Safeguards	1, 2, 3, 4
3	Securing Web Application, Services and Servers	1, 2, 3, 4
4	Intrusion Detection and Prevention	1, 2, 3
5	Cryptography and Network Security	1, 2, 3
6	Cyberspace and the Law	1, 2, 3
7	Cyber Forensics	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA3520
Course Name: Data Warehouse & Data Mining
Prerequisite Course(s): - SSCA1030 Database Management System, SSCA2011 Relational Database Management 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	
02	02	00	03	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s)of the Course:

To help learners to

- study data warehouse principles and its working
- learn Data mining concepts and understand Association Rule Mining
- study Classification Algorithms
- gain knowledge of how data is grouped using clustering technique

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration &Transformation, Data Reduction, Discretization and Concept Hierarchy Generation	05	20
2.	**Mining Frequent Patterns, Associations and Correlations** Basic concept, Efficient and scalable frequent itemset mining methods, Mining Association Rules, Association Mining to Correlation Analysis, Constraint-Based Association mining.	05	15

3.	**Data warehouse** Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.	05	15
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Classification:** Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics. Prediction: Accuracy and Error measures, Evaluating the accuracy of classifier or a predictor, Ensemble methods	08	25
5.	**Cluster Analysis** Types of data in cluster analysis, a categorization of major clustering methods, partitioning methods, hierarchical methods, density-based methods, grid-based methods, model-based clustering methods, clustering high dimensional data, outlier analysis.	07	25
	TOTAL	**30**	**100**

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to data mining tool: Orange	04
2.	Solve classification problems using Orange	04
3.	Solve clustering problems using Orange	04
4.	Introduction to data mining tool: XL Miner	02
5.	Introduction to data mining tool: Rapid Miner	02
6.	Introduction to data mining tool: SPSS Modeler	02
7.	Introduction to data mining tool: R	02
8.	Introduction to data mining tool: Knime	02
9.	Introduction to data mining tool: Tanagra	02
10.	Tools to create different data warehouse schemas	06
	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, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 marks per each practical and the 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.
- External viva consists of 30 marks during End Semester Exam.

Course Outcome(s):

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

SSCA3520	DATA WAREHOUSE & DATA MINING
CO 1	Interpret and utilize data mining techniques to discover pattern from the large datasets.
CO 2	Categorize and identify list of data mining methodologies to diagnose software for effective software development process.
CO 3	Reframe redundancy and incomplete data from the dataset using data preprocessing methods.
CO 4	Express strategic decisions using data warehousing architectures and tools.

Mapping of CO with PO

SSCA3520	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2	2	1	2		1	1	1	1	1
CO 2	1	2	2	1	2		2			1	1	1
CO 3	2	2	2	2	2	2	1		1			1
CO 4	3	2	3	3	3	2	2			2		2

Mapping of CO with PSO

SSCA3520	PSO1	PSO2	PSO3
CO 1	2	1	2
CO 2	1	2	2
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	1,2
2	Mining Frequent Patterns, Associations and Correlations	2,3
3	Data warehouse	2,4,5
4	Classification	3,4,5
5	Cluster Analysis	2,3,4,5,6

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS3512
Course Name: Artificial Intelligence
Prerequisite Course(s): -

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- understand basics of AI
- develop roles in future and also introduce the intelligence of machine
- design AI

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in%**
1.	**Introduction to Artificial Intelligence** Definition and scope of AI, History and evolution of Artificial Intelligence, Applications of AI in various fields, AI Techniques: Search algorithms (e.g., Depth-First Search, Breadth-First Search), Knowledge representation and reasoning.	03	10
2.	**Machine Learning Basics** Introduction to Machine Learning, Types of Machine Learning: Supervised, Unsupervised, and Reinforcement Learning, Machine Learning Algorithms: Linear regression, Logistic regression, k-nearest neighbors.	07	20
3.	**Natural Language Processing (NLP)** Introduction to Natural Language Processing, Techniques in NLP: Tokenization, Stemming and lemmatization, NLP Applications: Sentiment analysis, Text classification, Named Entity Recognition (NER).	05	20
Section II			
Module No.	**Content**	**Hours**	**Weightage in%**

4.	**Deep Learning** Introduction to Deep Learning, Neural networks architecture: Activation functions, Backpropagation. Deep Learning Architectures: Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs).	04	15
5.	**Computer Vision** Introduction to Computer Vision, Image preprocessing techniques. Feature extraction in Computer Vision, Applications of Computer Vision: Object detection, Image classification.	05	15
6.	**Reinforcement Learning** Introduction to Reinforcement Learning, Markov Decision Processes (MDPs), Reinforcement Learning Algorithms: Q-learning. Deep Q-Networks (DQNs)., Applications of Reinforcement Learning: Game playing., Robotics.	06	20
	TOTAL	**30**	**100**

List of Practical:

Sr No	Name of Practical	Hours
1.	Develop a simple search algorithm to assist users in finding relevant information within a large dataset, such as a library catalog or a database of products.	02
2.	Build a predictive model to estimate the price of a house based on its features (e.g., size, number of bedrooms, location) using historical housing data using python library.	02
3.	Analyze customer reviews from an e-commerce website to determine overall sentiment and identify common themes or issues raised by customers.	02
4.	Create a neural network model to classify images of handwritten digits (e.g., MNIST dataset) for use in automated digit recognition systems using latest python library.	02
5.	Develop a system to automatically detect and classify different types of fruits in images, which could be used in quality control processes for food production.	02
6.	Design a chatbot for a customer support service that can answer frequently asked questions, provide product information, and assist with common inquiries.	04
7.	Train an autonomous agent to navigate through a maze or obstacle course in a simulated environment, such as a robot exploring an unknown terrain.	06
8.	Develop a system to detect and count the number of vehicles in a traffic surveillance camera feed, which could be used for traffic flow analysis and congestion management.	04
9.	Analyze public sentiment on social media platforms (e.g., Twitter) regarding a specific topic or event, such as a new product launch or a political campaign.	04
10.	Deploy a trained image classification model as a web service to allow users to upload images and receive predictions on the content of those images, such as identifying objects or animals.	02

		TOTAL	**30**

Reference Book(s):

Title	Author/s	Publication
Artificial Intelligence	By Elaine Rich And Kevin Knight	(2nd Edition) Tata McGraw-Hill
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=EAIaIQobChMI55v6_uC55wIVjx0rCh001wW5EAAYAyAAEgJcyfD_BwE

Course Evaluation:

Theory:

- Continuous Evaluation consists of Two Test Each of 30 Marks and 1 Hour of duration.
- Faculty Evaluation consists of 10 marks as per guidelines provided by Course Coordinator.
- End Semester Examination consists 60 Marks.

Practical:

- Continuous Evaluation consists of Performance of Practical 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 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:

SSCS3512	ARTIFICIAL INTELLIGENCE
CO1	Compare ai with human intelligence and traditional information processing and discuss its strengths and limitations as well as its application to complex and human centered problems.
CO2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning
CO3	Develop artificial intelligence techniques for problem solving
CO4	Recall the knowledge representation using the appropriate technique for a given problem.
CO5	Apply AI techniques to solve different problems with machine learning algorithms.

Mapping of CO with PO

SSCS3512	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

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

Mapping of CO with PSO

SSCS3512	PSO1	PSO2	PSO3
CO 1	2	2	2
CO 2	3	3	
CO 3	3	3	3
CO 4		2	1
CO 5	3	3	

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

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

Module No	**Content**	**RBT Level**
1	Introduction to Artificial Intelligence	1, 2, 3
2	Machine Learning Basics	1, 2, 3, 4
3	Natural Language Processing (NLP)	1, 2, 3, 4
4	Deep Learning	1, 2, 3
5	Computer Vision	1, 2, 3
6	Reinforcement Learning	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS3520
Course Name: Cloud Computing
Prerequisite Course(s): - SSCS2010 Computer Networks, SSCS2041 Operating Systems

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

- identify the technical foundations of cloud systems architectures.
- Analyze the problems and solutions to cloud application problems.
- apply principles of best practice in cloud application design and management.
- identify and define technical challenges for cloud applications and assess their importance.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Cloud Computing Overview** Overview of Computing Paradigm, Recent trends in Computing : Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing	04	15
2.	**Introduction to Cloud Computing** Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers, Benefits and limitations of Cloud Computing,	04	15
3.	**Cloud Computing Architecture** Comparison with traditional computing architecture (client/server), Services provided at various levels, Service Models- Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), How Cloud Computing Works, Deployment Models- Public cloud, Private cloud, Hybrid cloud, Community cloud, Case study of NIST architecture.	07	20
Section II			
Module No.	Content	Hours	Weightage in%

4.	**Service Management in Cloud Computing** Service Level Agreements (SLAs), Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling.	05	15
5.	**Cloud Security** Infrastructure security; Network level security; Host level security; Application-level security; Data security and storage; Jurisdictional issues - data location identity; Access management, access control trust, reputation, risk authentication in cloud computing	05	15
6.	**Case Studies** Case study of Service model using Google App Engine, Microsoft Azure, Amazon EC2 Eucalyptus.	05	20
	TOTAL	**30**	**100**

List of Practical:

Sr No	Name of Practical	Hours
1.	Study of Cloud Computing & Architecture and setting up VPN	02
2.	Virtualization in Cloud.	02
3.	Study and implementation of Infrastructure as a Service	04
4.	Study and installation of Storage as Service	04
5.	Study and implementation of Platform as a Service	04
6.	Securing Servers in Cloud secure web server, how to secure data directory and introduction to encryption for own cloud.	04
7.	Administrative features of Cloud Management, User Management	02
8.	Create a virtual machine (VM) instance on Microsoft Azure.	
9.	Choose an appropriate operating system and machine configuration.	02
10.	Choose a specific Azure Cognitive Service (e.g., Text Analytics, Computer Vision, Speech Recognition). Develop a simple application or script to interact with the chosen Cognitive Service.	02
11.	Case study on Google App. Engine	02
	TOTAL	**30**

Reference Book(s):

Title	Author/s	Publication
Cloud computing a practical approach	Anthony T.Velte , Toby J. Velte Robert Elsenpeter	TATA McGraw- Hill
Cloud Computing (Principles and Paradigms)	Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinsk	John Wiley & Sons, Inc

Web Material Link (s):

- https://onlinecourses.nptel.ac.in/noc21_cs14/preview
- https://www.futurelearn.com/info/courses/key-topics-in-digital transformation/0/steps/257567

Course Evaluation:

Theory:

- Continuous Evaluation consists of Two Test Each of 30 Marks and 1 Hour of duration.
- Faculty Evaluation consists of 10 marks as per guidelines provided by Course Coordinator.
- End Semester Examination consists 60 Marks.

Practical:

- Continuous Evaluation consists of Performance of Practical 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 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:

SSCS3520	CLOUD COMPUTING
CO1	Describe the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics.
CO2	Discuss system virtualization and outline its role in enabling the cloud computing system model.
CO3	Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as amazon s3 and hdfs.
CO4	Generalize various security mechanisms; management and other distinguish services of aws.
CO5	Deploy applications over commercial cloud.

Mapping of CO with PO

SSCS3520	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2	3	2				1	3	3	3
CO 2	2	3	2	3	3				1		3	
CO 3	2	2	2	3	2				1			
CO 4	1	2	2	2	3				1			2
CO 5	1	3		2	3				1	1	1	

Mapping of CO with PSO

SSCS3520	PSO1	PSO2	PSO3
CO 1	2		2
CO 2	2	2	3
CO 3	3	3	
CO 4	3	3	3
CO 5		2	3

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

1: Remember	2: Understand	3: Apply

4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Cloud Computing Overview	1, 2
2	Introduction to Cloud Computing	1, 2
3	Cloud Computing Architecture	1, 2, 3
4	Service Management in Cloud Computing	1, 2, 3
5	Cloud Security	1, 2, 3
6	Case Studies	1, 2, 3, 4

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSIT3570
Course Name: Online Course
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	-	-	03	100	00	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help the learners to

- learn new subjects as per recent trends in the industry from national experts.

Course Content:

Performance analysis will be based on any one of the following subjects:

1. Deep Learning
2. Computer Graphics
3. Natural Language Processing
4. Blockchain Technology
5. Virtual Reality
6. Real time systems
7. Big Data
8. Advanced graph theory
9. Theory of computation
10. Cryptology

Or any other online course; available time to time.

Course Evaluation:

Practical:

- Continuous Evaluation as per the guidelines of NPTEL assignments and tests.
- The online course certificate score will be directly fetched and converted out of 100.

Course Outcome(s):

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

SSIT3570	**ONLINE COURSE**

CO1	Execute acquired knowledge within the chosen area of technology.
CO2	Learn related subject and contents from academia experts from iits & other estemeed institutes.
CO3	Formulate and implement innovative ideas in a concerned field.
CO4	Associate with academia experts and learn trending technologies.
CO5	Correlate with the industry aligned courses in the field of information technology.

Mapping of CO with PO

SSIT3570	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	3		3	3					1	2
CO 2	1				3	3				1	0	2
CO 3	1	3	3	3								1
CO 4	1				3	3						
CO 5	1									1	1	2

Mapping of CO with PSO

SSIT3570	PSO1	PSO2	PSO3
CO 1	2	3	1
CO 2			2
CO 3	3	3	3
CO 4	3	1	3
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	Online Course	1, 2, 3

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS3920
Course Name: Project/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	
-	17	-	17	-	-	200	300	-	-	500

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- identify, analyze and articulate projects with a comprehensive and systematic approach.
- develop creative thinking.
- develop Ability to solve problem
- learn working in a team.

Outline of the Project/Training:

Project

- The project will be aligned with the aims of the engineering programme and its areas of specialization and shall be based on the recent trends in technology.
- The student shall carry out a comprehensive project at relevant academic / R&D / industrial organization.
- The student is required to submit a project report based on the work carried out.

Training

- The aim of this course is to use the internship experience to enable students to develop their engineering skills and practices.
- The student will be placed in industry/organization for 12 to 18 weeks and assessed for academic credit.
- The students may select industry on their own or one which is offered by institute.
- Students are expected to experience a real-life engineering workplace and understand how their engineering and professional skills can be utilized in industry.
- The student is required to submit a project report based on the work carried out.

Course Evaluation :

Sr. No	Evaluation criteria	Marks
1.	Selection of the topic (Within first 30 Days of commencement of semester)	50
2.	Initial Presentation of the topic (Within 31 to 45 Days of commencement of semester)	50
3.	An actual work carried out. (Within 46 to 70 Days of commencement of semester)	200
4.	Report writing as per guidelines	50
5.	Presentation & Question-Answer session	150
	Grand Total	**500**

Course Outcome(s):

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

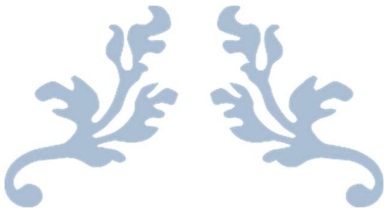
SSCS3920	PROJECT/TRAINING
CO 1	Support the theoretical learning with practice and integrate knowledge for engineering applications
CO 2	Adapt to real time industry exposure and experience
CO 3	Solve challenging projects for commercial, societal and environment benefit.
CO 4	Explain the importance of planning, documentation, punctuality and work ethics.
CO 5	Document the work which is carried out in proper format with industry standards.

Mapping of CO with PO

SSCS3920	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	3	3	3	2	3	1	2	3	3	3
CO 2	3	3	3	3	3	3	3	1	3	2		1
CO 3	2	3	3	3	2	3	1	1	3			2
CO 4	3	2	3	3	3	2	1	1	2		2	
CO 5	1	3	2	2	2	2	2	3	3		2	

Mapping of CO with PSO

SSCS3920	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	3	3
CO 3	3	3	3
CO 4	1	3	2
CO 5	2	3	2



FOURTH YEAR B. SC (IT)

P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION																
TEACHING & EXAMINATION SCHEME FOR B.Sc.IT PROGRAMME with Provision of Honors (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**	
7	SSCA4010	Augmented Reality & Virtual Reality	CA	3	2	0	5	4	40	60	40	60	0	0	200
	SSCA4020	Full Stack Development	CA	3	2	0	5	4	40	60	40	60	0	0	200
	SSCA4030	Image Processing	CA	3	2	0	5	4	40	60	40	60	0	0	200
	SSCS4010	DevOps and Agile Foundation	CS	3	2	0	5	4	40	60	40	60	0	0	200
	SSCS4020	Cryptography & Network Security	CS	3	2	0	5	4	40	60	40	60	0	0	200
						Total	**25**	**20**							**1000**
8	SSCS4030	Online Course	CS	5	0	0	5	5	100	0	0	0	0	0	100
	SSCS4910	Research Project/Industrial Project	CS	0	20	0	20	20	0	0	200	300	0	0	500
						Total	**25**	**25**							**600**
						Grand Total	**207**	**180**							**6900**

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Application

Course Code: SSCA4010
Course Name: Augmented Reality and Virtual Reality
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

- Use Augmented Reality (AR) and Virtual Reality (VR) technologies to enhance the experience
- Use Augmented Reality to create immersive content, while integrating immersive technologies to help advance the sophistication.

Course Content:

Section-I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to AR and VR:** Evolution and History of AR & VR, Characteristics and importance of immersive technologies, Difference between AR, VR, and Mixed Reality (MR), Applications in daily life	05	10
2.	**AR & VR System Components:** AR System architecture and components, VR System components: Head-mounted displays, sensors, and input devices Hardware requirements for AR/VR, Limitations and challenges	05	10
3.	**AR Tools and Development Platforms:** Overview of software tools: Unity, ARCore, ARKit, Vuforia, Spark AR Setting up an AR environment Understanding SDKs and APIs for AR Introduction to Cloud-based AR	06	15
4.	**VR Tools and Development Platforms:** Overview of VR toolkits and platforms Unity for VR development Creating 3D environments Navigation and interaction in virtual spaces	06	15
Section-II			
5.	**Design and Implementation of AR/VR Applications:**	06	15

	Designing immersive content Understanding user experience (UX) in AR/VR Prototyping and testing Case study: Simple AR-based mobile app		
6.	**AR/VR in Real-world Applications:** AR/VR in Education, Healthcare, Tourism, and Retail AR for marketing and data visualization VR for simulation and training Industrial and entertainment applications	06	15
7.	**Future Trends and Research Areas:** Integration of AR/VR with AI, IoT, and Cloud Spatial computing and holographic interfaces Metaverse and immersive learning environments Challenges: privacy, security, and ethics	05	10
8.	**Mini Project and Case Study:** Hands-on project using Spark AR / Unity Develop a small AR or VR-based demo Presentation and discussion on current AR/VR innovations	06	10
	Total	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to Spark and the Fundamentals Function	04
2.	Create a Face Detection App using spark.	08
3.	Introduction to Unity and its installation.	04
4.	Introduction to AR foundation; Installing AR foundation SOK; SOK setup	10
5.	Introduction to C-sharp and its Basics	04
	TOTAL	**30**

Text Book (s):

Title	Author/s	Publication
Understanding Virtual Reality: Interface, Application and Design	William R Sherman and Alan B Craig	Morgan Kaufmann Publishers

Reference Book (s):

Title	Author/s	Publication
Innovating with Augmented Reality: Applications in Education and Industry	Taylor & Francis Group	CRC Press,
Designing Virtual Systems: The Structured Approach	Gerard Jounghyun Kim	WILEY
3D User Interfaces, Theory and Practice	Doug A Bowman, Ernest Kuijff, Joseph J LaViola	Addison Wesley

Web Material Link(s):

- https://nptel.ac.in/courses/106/106/106106138/
- https://www.coursera.org/learn/introduction-virtual-reality
- https://www.youtube.com/playlist?list=PLbMVogVj5nJSyt80VRXYC-YrAvQuUb6dh.

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 hour of duration, which

will be converted to 30 marks.

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

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the 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.
- External viva consists of 30 marks.

Course Outcome(s):

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

SSCA4010	**Augmented Reality and Virtual Reality**
CO 1	Explain the fundamental concepts, historical evolution, differentiating characteristics, and core hardware/software components of Augmented Reality, Virtual Reality, and Mixed Reality systems.
CO 2	Utilize industry-standard development platforms and toolkits, such as Unity, Spark AR, and AR Foundation, to create basic immersive environments, content, and interactions for both AR and VR applications.
CO 3	Design and Implement simple AR/VR applications by applying user experience (UX) principles, prototyping methodologies, and testing procedures, culminating in a hands-on mini-project.
CO 4	Analyze and Differentiate the applicability of AR and VR technologies across diverse real-world domains, including education, healthcare, industrial simulation, retail, and entertainment.
CO 5	Evaluate the emerging future trends, research areas, and inherent ethical, privacy, and security challenges associated with the integration of AR/VR with technologies like AI, IoT, and the Metaverse.

Mapping of CO with PO

SSCA4010	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	2	1	1	2	1		1	1	1		2
CO 2	2	3	3	3	2		2			2	2	2
CO 3	2	3	3	3	3	2		1	1	3	3	2
CO 4	1	1	2	1	3	3	1	2	2	2	1	1
CO 5	1	2	1	2	3	3	2	2	3	1	1	3

Mapping of CO with PSO

SSCA4010	PSO1	PSO2	PSO3
CO 1	2	3	1
CO 2	3	3	2
CO 3	3	3	3
CO 4	1	2	1
CO 5	1	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	Module 1: Introduction to AR and VR:	1,2,4
2	Module 2: AR & VR System Components:	2,3,4
3	Module 3: AR Tools and Development Platforms:	2.3
4	Module 4: VR Tools and Development Platforms:	1,2,3
5	Module 5: Design and Implementation of AR/VR Applications:	2,3,6
6	Module 6: AR/VR in Real-world Applications:	2,4
7	Module 7: Future Trends and Research Areas:	2,3,4,5
8	Module 8: Mini Project and Case Study:	5,6

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Application

Course Code: SSCA4020
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	
03	02	-	04	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

Section-I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Introduction:** Client-Server Architecture, Frontend vs Backend, Overview of different Technology stacks, Development workflows (Agile, Git, DevOps basics).	03	05
2.	**HTML & CSS Fundamentals:** HTML5 Structure, Semantic elements, CSS3 styling, Responsive design with Flexbox & Grid, CSS frameworks (Bootstrap/Tailwind CSS basics).	05	10
3.	**JavaScript & JQuery for Frontend:** 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	08	18

	elements using jQuery, jQuery HTML, jQuery Traversing, jQuery AJAX & Misc.		
4.	**Tailwind** Introduction to Tailwind, Tailwind: features and benefits, Installing Tailwind, Tailwind Predefined classes, Responsive Design, Reusable components.	03	06
Section-II			
5.	**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.	08	20
6.	**Backend Development with Node.js & Express.js:** 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. Express.js framework, Routing, Middleware, RESTful APIs, Authentication Basics.	07	18
7.	**Database Integration:** Relational (MySQL) vs NoSQL (MongoDB) databases, CRUD operations with SQL & MongoDB, Connecting Node.js with MongoDB/MySQL, Create and Manage MongoDB, Migration of Data into MongoDB.	05	10
8.	**Authentication, Security & Deployment:** JWT Authentication, Sessions, Cookies, Password hashing (bcrypt), securing APIs, Deployment: Netlify, Vercel, Heroku, Render, Docker basics.	06	13
	TOTAL	**45**	**100**

List of Practicals:

Sr. No	Name of Practical	Hours
1.	Install VS Code, Git, and configure the development environment and Create a GitHub account and push your first repository.	02
2.	Create a personal portfolio webpage using HTML5 semantic tags and Apply CSS3 styles (Flexbox, Grid, media queries) for responsiveness.	04
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.	04
4.	Design a responsive landing page using Tailwind. Implement a Tailwind navigation bar for a product page.	04
5.	Make interactive web pages with reactJS concepts.	04
6.	Design web application with back end of NodeJS.	04

7.	Connect Node.js with MongoDB and Perform CRUD operations (Create, Read, Update, Delete) on a MongoDB collection. Integrate MySQL database and execute SQL queries from Node.js.	04
8.	Develop Complete Web application as a mini project.	04
	TOTAL	**30**

Text Book (s):

Title	Author/s	Publication
Full Stack Web Development For Beginners	Riaz Ahmed	Atlantic publisher

Reference Book(s):

Title	Author/s	Publication
Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics (5th Edition).	Jennifer Niederst Robbins	O'Reilly Media
Learning React: Modern Patterns for Developing React Apps (3rd Edition).	Alex Banks & Eve Porcello	O'Reilly Media
Web Development with Node and Express: Leveraging the JavaScript Stack.	Ethan Brown	O'Reilly Media

Web material link:

- https://www.coursera.org/learn/fullstack-web-development
- https://market.tutorialspoint.com/course/the-full-stack-web-development/index.asp
- https://www.youtube.com/watch?v=nu_pCVPKzTk (Free CodeCamp)

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 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 the End Semester Exam.

Course Outcome(s):

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

SSCA4020	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

SSCA4020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1		2	1	1			1		2
CO 2	2	2	3		2	1		1		2	2	2
CO 3	2	2	3		3	1	2	2	2	2		2
CO 4	2	3	3	2	3				2	2		2
CO 5	3	3	3	2	3	1	2	1	2	2	2	3

Mapping of CO with PSO

SSCA4020	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	2	2	2
CO 3	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	Introduction	2,4
2	HTML & CSS Fundamentals	2,3,6
3	JavaScript & JQuery for Frontend	1,3,6
4	Tailwind	1,4,6
5	Frontend with ReactJS	1,3,6
6	Backend Development with Node.js & Express.js	1,2,3,5
7	Database Integration	2,4,5
8	Authentication, Security & Deployment	2,4,6

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Application

Course Code: SSCA4030
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	
03	02	-	04	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- To understand the fundamental concepts of digital images, including representation, sampling, and quantization.
- Image enhancement and restoration techniques should be applied in both spatial and frequency domains to improve image quality and remove distortions.
- Analyze and implement core image processing methods, such as segmentation, morphological operations, and compression, to solve practical problems.
- To explore real-world applications of image processing in domains such as medical imaging, biometrics, remote sensing, and multimedia, thereby linking theory with practice.

Course Content:

Section-I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Introduction:** Fundamentals of Digital Images, Image as a 2D Signal: Pixels, Resolution, Image Representation (Binary, Grayscale, Color), Sampling and quantization, Basic Pixel Relationships (Neighbors, Connectivity, Distance Measures), Applications of image processing in IT and industry.	05	10
2.	**Digital Image Enhancement:** **Spatial Domain Techniques:** Intensity Transformations (Contrast Stretching, Log Transform, Power-law Transform), Histogram Processing (Equalization, Specification), Arithmetic and Logical Operations on Images, Spatial Filtering: Smoothing (Mean, Median, Gaussian) and Sharpening Filters (Laplacian, Gradient-based). **Frequency Domain Techniques:** Basics of the Fourier transform for Images, Low-pass and high-pass Filtering, Smoothing and Sharpening in the Frequency Domain.	08	15

3.	**Digital Image Restoration:** Image Degradation Models (Blur, Noise), Noise Removal Techniques: Mean, Median, Adaptive Filters, Introduction to Inverse Filtering and Wiener Filtering (Conceptual, Not Mathematical Depth).	06	10
4.	**Color Image Processing:** Basics of Color Models: (RGB, CMY, HSV/HSI), Pseudo-Color Image Processing, Color Image Enhancement Techniques.	04	08
	Section-II		
5.	**Digital Image Compression:** Need for compression, Redundancies in images, Lossless Compression: Run-Length Encoding (RLE), Huffman Coding, LZW, Lossy Compression: JPEG basics (DCT overview), Emerging formats: PNG, JPEG2000 (conceptual introduction).	06	15
6.	**Digital Image Segmentation:** Edge detection: (Sobel, Canny), Thresholding Methods (Global, Otsu's, Adaptive), Region-based Segmentation (Region Growing, Region Splitting/Merging), Hough transform for line/circle detection.	06	15
7.	**Morphological Image Processing:** Binary morphology: Erosion, Dilation, Opening, Closing, Basic Morphological Algorithms: Boundary Extraction, Hole Filling, Connected Components, Skeletonization, Thinning.	06	15
8.	**Applications & Case Studies:** Object detection and recognition (Intro with OpenCV), Face detection (intro to deep learning-based approaches), OCR (Optical Character Recognition basics), Image processing applications in: Medical imaging, Remote sensing, Multimedia (filters, compression), Security and biometrics.	04	12
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Load and display images in Python using OpenCV.	02
2.	Convert images into grayscale and different color models (RGB to Gray image, RGB to Indexed image, and Gray to Indexed image).	02
3.	Read an 8-bit 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.	Apply spatial filters: mean, median, Gaussian, Laplacian.	02
5.	Implement the Fourier transform of an image and visualize frequency components.	02
6.	Apply noise and restore the image using filtering techniques.	02
7.	Edge detection using Sobel, Prewitt, and Canny operators.	02
8.	Implement thresholding (global, adaptive, Otsu).	02

9.	Perform morphological operations (erosion, dilation, opening, closing).	02
10.	Apply the Hough transform for line/circle detection.	02
11.	Case study: Face detection using OpenCV.	04
12.	Mini Project: Apply an image processing pipeline to a dataset (medical images, traffic signs, or biometric images).	04
	TOTAL	**30**

Text Book (s):

Title	Author/s	Publication
Digital Image Processing: An Algorithmic Approach	Madhuri A. Joshi	PHI Learning

Reference Book(s):

Title	Author/s	Publication
Digital Image Processing	Rafael C. Gonzalez, Richard E. Woods	Pearson Education
Fundamentals of Digital Image Processing	ITL Education Solutions Limited	Prentice Hall India Learning
Digital Image Processing	William K. Pratt	John Wiley & Sons

Web material link:

- https://nptel.ac.in/courses/106105032
- https://nptel.ac.in/courses/117105135
- https://www.geeksforgeeks.org/electronics-engineering/what-is-image-processing/

Course Evaluation:

Theory:

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

Practical

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

Course Outcome(s):

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

SSCA4030	**IMAGE PROCESSING**

CO 1	Explain the fundamental concepts of digital images, including representation, sampling, quantization, and basic pixel relationships, along with the principles of various color models.
CO 2	Apply image enhancement techniques (Intensity transformations, Histogram, Spatial/Frequency filtering) and image restoration methods (Noise models, Wiener filter concepts) to improve image quality.
CO 3	Analyze and implement core image processing algorithms for compression (RLE, Huffman, JPEG basics) and morphological operations (Erosion, Dilation, Opening, Closing).
CO 4	Implement image analysis techniques, including segmentation (Thresholding, Edge detection, Hough transform) and region-based methods, to extract meaningful information from images.
CO 5	Develop an image processing pipeline and evaluate its performance for real-world applications in domains like medical imaging, biometrics, and face detection/recognition.

Mapping of CO with PO

SSCA4030	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	1	1	1	1	1	2		1	1		1
CO 2	3	3	2	3	2	1				1	1	2
CO 3	3	3	2	3	2	1	2	1	1	1	1	2
CO 4	2	3	3	3	2	1				1	1	2
CO 5	2	2	3	3	3	3	1	2	2	3	3	3

Mapping of CO with PSO

SSCA4030	PSO1	PSO2	PSO3
CO 1	1	3	1
CO 2	2	3	2
CO 3	2	2	2
CO 4	3	3	2
CO 5	3	3	3

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

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

Module No	Content	RBT Level
1	Introduction	1,2
2	Digital Image Enhancement	1,2,4
3	Digital Image Restoration	2,3,5
4	Color Image Processing	2,5
5	Digital Image Compression	2,5
6	Digital Image Segmentation	4,5
7	Morphological Image Processing	2,4,5

8	Applications & Case Studies	3,6

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS4010
Course Name: DevOps and Agile Foundation
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:
This course introduces the fundamentals of Agile and DevOps practices, emphasizing automation, collaboration, and continuous delivery. Students will gain practical skills with tools like Git, Jenkins, Docker, and Kubernetes to build and manage efficient CI/CD pipelines.

Course Content:

Section-I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Foundations: Agile & DevOps:** Agile manifesto & principles, Lean thinking, DevOps history/Three Ways, DevOps benefits & failure modes, culture & team responsibilities	06	10
2.	**Agile Frameworks & Project Practices:** Scrum roles/artifacts/ceremonies, Kanban basics, user stories, story points, release planning, velocity & retrospectives	05	10
3.	**Version Control & Collaborative Workflows:** Git basics, branching/merge strategies, pull requests, code review, GitHub/GitLab workflows, protected branches	06	15
4.	**Continuous Integration (CI):** Build automation, unit tests, pipeline as code, Jenkins/GitLab CI/GitHub Actions examples, artifact repositories (Nexus)	06	15
Section-II			
5.	**Continuous Delivery / Continuous Deployment (CD):** Deployment pipelines, blue/green & canary releases, feature flags, release automation, rollback strategies	06	15
6.	**Infrastructure as Code & Configuration Management:** IaC principles, Terraform basics, configuration management (Ansible), immutable infra vs mutable infra, environment parity	06	15
7.	**Containerization & Orchestration:**	05	10

	Docker images & compose, container registries, Kubernetes basics (pods, services, deployment), helm intro		
8.	**Monitoring, Security, Metrics & Mini-Project:** Prometheus/Grafana basics, logging (ELK/Loki), SAST/DAST intro, DevOps KPIs (lead time, MTTR),Observability, mini-project presentations	05	10
	Total	45	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Git & GitHub basics (clone, commit, branches)	02
2.	Branching strategies & PR workflow (feature branches, rebasing, code review)	04
3.	CI with GitHub Actions (build + unit tests)	02
4.	Jenkins Pipeline (declarative) (simple pipeline + unit tests + artifact publish)	04
5.	Artifact repo & build tools (Maven/Gradle + Nexus)	02
6.	Docker basics & Docker Compose (containerize a sample app)	04
7.	Kubernetes: deploy app, service, scaling (minikube / kind)	02
8.	Monitoring & Logging (Prometheus + Grafana dashboard, basic alert)	02
9.	Mini DevOps project (end-to-end: Git → CI → CD → monitor)	08
	TOTAL	**30**

Text Book (s):

Title	Author/s	Publication
The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations	Gene Kim, Jez Humble, Patrick Debois, John Willis	IT Revolution Press / Shroff Publishers & Distributors (India Edition)

Reference Book (s):

Title	Author/s	Publication
Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation	Jez Humble & David Farley	Pearson
Accelerate: The Science of Lean Software and DevOps	Nicole Forsgren, Jez Humble, Gene Kim	IT Revolution

Web Material Link(s):

- https://learn.microsoft.com/en-us/training/modules/introduction-to-devops/?utm_source=chatgpt.com
- https://www.geeksforgeeks.org/devops/devops-tutorial/
- https://grow.google/agile-essentials/

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the 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.
- External viva consists of 30 marks.

Course Outcome(s):

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

SSCS4010	DevOps and Agile Foundation
CO 1	Explain Agile values/principles and DevOps culture, benefits and lifecycle.
CO 2	Apply Scrum/Kanban practices to plan and run iterative deliveries.
CO 3	Use and analyze core DevOps tools: Git workflows, automated builds, CI servers, artifact repo.
CO 4	Design and implement CI/CD pipelines, containerized delivery and Infrastructure as Code.
CO 5	Integrate monitoring, logging, security scanning, and metrics; deliver a working mini DevOps pipeline/project and reflect on continuous improvement.

Mapping of CO with PO

SSCS4010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1	1	2	1	1			1	2	
CO 2	3	3	2	2		2		2	3			
CO 3	2	3					2				1	
CO 4	3	3		2	1	2		2		1		2
CO 5	2	2	2	2	2	2	2	1	3	2	2	2

Mapping of CO with PSO

SSCS4010	PSO1	PSO2	PSO3
CO 1	2	1	2
CO 2	3	2	2
CO 3	2	3	2
CO 4	3	3	2
CO 5	2	2	3

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

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

Module No	Content	RBT Level
1	Foundations: Agile & DevOps	1.2
2	Agile Frameworks & Project Practices	2,3
3	Version Control & Collaborative Workflows	2,4
4	Continuous Integration (CI)	2,4

5	Continuous Delivery / Continuous Deployment (CD)	2,4,5
6	Infrastructure as Code & Configuration Management	2,4,5
7	Containerization & Orchestration	2,3,4,6
8	Monitoring, Security, Metrics & Mini-Project	5,6

P P Savani University
School of Engineering
Institute of Computer Science and Application
Department of Computer Science

Course Code: SSCS4020
Course Name: Cryptography & Network 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	
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 cryptography theories, algorithms, and systems.
- understand the various key distribution and management schemes.
- understand how to deploy hashing techniques to secure data in transit across different networks.

Course Content:

Section-I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Introduction to Cryptography & Security Concepts:** Concepts of information security, Security services, attacks, and mechanisms, Cryptography overview, Steganography, and Cryptanalysis basics.	05	10
2.	**Classical Encryption Techniques:** Conventional encryption model, Substitution & Transposition ciphers (Caesar, Playfair, Hill, Vigenère), Stream vs Block ciphers.	05	10
3.	**Modern Block Ciphers:** Principles of block ciphers, Shannon's theory of confusion & diffusion, Feistel structure – DES, 3DES, AES overview, Block cipher modes (ECB, CBC, CFB, OFB).	06	15
4.	**Mathematical Foundations for Cryptography:** Modular arithmetic, Prime & relative prime numbers, Euclid's Algorithm, Fermat's & Euler's theorem, Chinese Remainder Theorem, Random number generation.	05	10
Section-II			

5.	**Public Key Cryptography:** Principles of public-key systems, RSA Algorithm, Diffie-Hellman key exchange, Elliptic Curve Cryptography (Introduction), ElGamal encryption.	06	15
6.	**Message Authentication & Hash Functions:** Authentication requirements, MAC & hash functions, MD5, SHA, Birthday attack, Digital signatures, DSS.	06	15
7.	**Network and Web Security:** IP Security architecture, Authentication header, ESP, SSL/TLS, SET, Email security (PGP, S/MIME), Key management concepts.	06	15
8.	**System Security & Intrusion Prevention:** Intruders, Viruses, and Worms, Firewall design, IDS/IPS, Trusted systems, Security policies, and best practices.	06	10
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Implementation of Caesar Cipher (Encryption and Decryption).	02
2.	Implementation of Playfair Cipher using Python.	02
3.	Implementation of Hill Cipher.	02
4.	Implementation of the Vigenère Cipher.	02
5.	Demonstrate DES encryption using OpenSSL or Python Cryptography library.	02
6.	Implementation of the RSA Algorithm (Encryption and Decryption).	02
7.	Implementation of Diffie-Hellman Key Exchange.	02
8.	Generate hash values using MD5 and SHA algorithms.	02
9.	Simulation of a digital signature using Python.	02
10.	Analyze packet security using Wireshark.	02
11.	Simulate an SSL/TLS handshake using OpenSSL.	02
12.	Configure and test a basic Firewall using Windows/Linux tools.	02
13.	Demonstrate Email encryption using the PGP tool.	02
14.	Perform basic steganography using open-source tools.	02
15.	Case study on recent cyberattacks and prevention techniques.	02
	TOTAL	**30**

Text Book (s):

Title	Author/s	Publication
Cryptography and Network Security: Principles and Practice.	William Stallings	Prentice Hall

Reference Book(s):

Title	Author/s	Publication
Cryptography and Network Security	Behrouz A. Forouzan	McGraw-Hill
Network Security: Private Communications in a Public World, 2nd edition	Kaufman, Perlman, and Speciner	Prentice Hall
Handbook of Applied Cryptography	Menezes, van Oorschot and Vanstone.	CRC Press

Web material link:

- https://nptel.ac.in/courses/106105031
- https://www.omnisecu.com/security/index.php

Course Evaluation:

Theory:

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

Practical

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

Course Outcome(s):

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

SSCS4020	Cryptography & Network Security
CO 1	Explain the fundamental concepts of cryptography, information security services, and various types of security attacks.
CO 2	Apply classical and modern encryption techniques to secure data communication.
CO 3	Utilize mathematical foundations such as modular arithmetic and number theory in cryptographic algorithms.
CO 4	Implement public-key cryptography, message authentication, and hashing techniques for data integrity and authentication.
CO 5	Analyze and apply network, web, and system security mechanisms to prevent intrusions and ensure secure communication.

Mapping of CO with PO

SSCS4020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2			2		1	1				1
CO 2	2	3	2		2		1	1				2

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

Mapping of CO with PSO

SSCS4020	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	2	3	2
CO 3	2	3	3
CO 4	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 Cryptography & Security Concepts	1,2
2	Classical Encryption Techniques	2,3
3	Modern Block Ciphers	2,3,4
4	Mathematical Foundations for Cryptography	2,3,4
5	Public Key Cryptography	2,3,4,5
6	Message Authentication & Hash Functions	2,3,4,5
7	Network and Web Security	2,3,5,6
8	System Security & Intrusion Prevention	2,3,5,6

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS4030
Course Name: Online Course
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	
05	-	-	05	100	00	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help the learners to

- learn new subjects as per recent trends in the industry from national experts.

Course Content:

Performance analysis will be based on any one of the following subjects:

11. Deep Learning
12. Computer Graphics
13. Natural Language Processing
14. Blockchain Technology
15. Virtual Reality
16. Real time systems
17. Big Data
18. Advanced graph theory
19. Theory of computation
20. Cryptology

Or any other online course; available time to time.

Course Evaluation:

- Continuous Evaluation as per the guidelines of NPTEL assignments and tests.
- The online course certificate score will be directly fetched and converted out of 100.

Course Outcome(s):

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

SSCS4030	**ONLINE COURSE**
CO1	Execute acquired knowledge within the chosen area of technology.

CO2	Learn related subject and contents from academia experts from iits & other estemeed institutes.
CO3	Formulate and implement innovative ideas in a concerned field.
CO4	Associate with academia experts and learn trending technologies.
CO5	Correlate with the industry aligned courses in the field of information technology.

Mapping of CO with PO

SSCS4030	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1		1		2	1			1			1
CO 2	1		2	2	2		1		1	1	2	2
CO 3		2	2	2	2			1		2		
CO 4	2	1		1	1	1	1			1	1	2
CO 5						1	2	1		2	2	3

Mapping of CO with PSO

SSCS4030	PSO1	PSO2	PSO3
CO 1	2	2	3
CO 2	3	2	2
CO 3	2	3	3
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	Online Course	1, 2, 3, 4, 5, 6

P P Savani University
School of Engineering
Institute of Computer Science and Application

Department of Computer Science

Course Code: SSCS4910
Course Name: Research Project/ Industrial Project
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	
-	20	-	20	-	-	200	300	-	-	500

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- identify, analyze, and articulate projects with a comprehensive and systematic approach.
- develop creative thinking.
- perform in a team.

Course Content:

Module No.	Content
1.	**Selection of Title** Select a topic of interest to work upon which can be from any domain. After selecting the topic and proposing the title, get approval from the concerned faculty
2.	**Literature Review** Study in detail about the topic chosen.
3.	**Project Proposal** Prepare the proposal on the aspect of the selected area to work upon.
4.	**Implementation** Implementation of the proposal in any of the programming languages
5.	**Report Writing** The report must be prepared as per suggested guidelines consisting of Software Engineering, Preamble, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure.
6.	**Presentation & Question-Answer** At the end of the semester, the student/group of students shall give a presentation of their work followed by a viva-voce examination.

Course Evaluation:

Sr. No	Evaluation Criteria	Marks
Continuous Evaluation		
1.	Selection of the topic (Within first 20 Days of commencement of semester)	20

2.	Initial Presentation of the topic	20
3.	An actual work carried out.	20
4.	Report writing as per guidelines.	20
5.	Project and report submission	20
6.	Presentation & Question-Answer session.	100
	TOTAL	**200**
End Semester Evaluation		
1.	Presentation & Viva	**300**

Course Outcome(s):

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

SSCS4910	**Research Project/Industrial Project**
CO1	Analyse and identify user requirements for solving real-world, social, or environmental problems.
CO2	Formulate a suitable problem statement and develop feasible solution approaches.
CO3	Apply relevant technologies, tools, and design techniques to implement the proposed solution.
CO4	Evaluate and test the developed solution for functionality, usability, and effectiveness.
CO5	Prepare comprehensive project documentation and present outcomes effectively through reports and presentations.

Mapping of CO with PO

SSCS4910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2	3	2	1			2		1
CO 2	3	3	3		3			2				
CO 3	3	3	3		3	2	2		2	2	2	2
CO 4	3	3	2	3	3						2	3
CO 5	3	3	3	3	3	2	2	2	2	3	3	3

Mapping of CO with PSO

SSCS4910	PSO1	PSO2	PSO3
CO 1	2	2	3
CO 2	3		3
CO 3	2	3	2
CO 4	2	2	
CO 5	3	2	3

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

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

Module No	Content	RBT Level
1	Selection of Title	2
2	Literature Review	4

3	Project Proposal	2,3
4	Implementation	5,6
5	Report Writing	4,6
6	Presentation & Question-Answer	4,5