PPSU

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

BACHOLAR OF COMPUTER APPLICATION (BCA)

SYLLABUS BOOK

AY 2022-23

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) BACHELOR OF COMPUTER APPLICATION (BCA)
PSO 1	Develop competency to design a computing system to meet desired needs within realistic constraints such as security and applicability in multidisciplinary teams with positive attitude.
PSO 2	Apply current techniques, skills, and tools necessary for computing practices.
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)

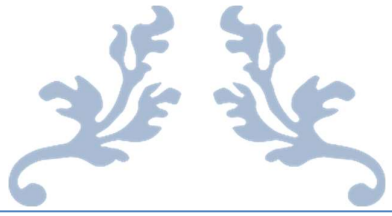
Syllabus Book

B.C.A.

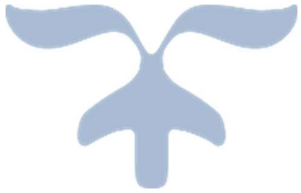
P P Savani University
School of Engineering

Effective From: 2022-23
Authored by: P P Savani University

CONTENT



FIRST YEAR B.C.A.



P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION																
TEACHING & EXAMINATION SCHEME FOR BCA PROGRAMME AY: 2022-23																
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	-	-	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	05	40	60	40	60	-	-	200
	CFLS1030	Functional English-I	CFLS	02	-	-	02	02	40	60	-	-	-	-	100
						Total	**24**	**20**							**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
	CFLS1040	Functional English-II	CFLS	02	-	-	02	02	40	60	-	-	-	-	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.	07	16
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Matrix Algebra:** Introduction, Types of Matrices, Operations of Matrices, Adjoint Matrices, Solution of System of Equations by Matrix Inversion Method, Applications of Matrix.	06	14
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 Practical	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	-	-	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		2	2		1							
CO 2		2	1		1							
CO 3		2	1		1							
CO 4		2	2		1							
CO5		2	2		1							

Mapping of CO with PSO

SSCA1010	PSO1	PSO2	PSO3
CO 1	3	3	2
CO 2	1		
CO 3	3	3	2
CO 4	3	3	2
CO5	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	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 Tutorial:

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
CO 1	Gain a basic understanding of computer arithmetic.
CO 2	Learn memory organization and types of backups in computer systems.
CO 3	Develop various office automation applications.
CO 4	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 Micro-operations	2,3
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 Clanguage, 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	INTRODUCTION 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	2	1		1	1							
CO 2	2	1		1	1							
CO 3	2	1		1	1							
CO 4	2	1	1	2	1							
CO5	2	2	1	2	1							

Mapping of CO with PSO

SSCS1010	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	2	3
CO 3	3	2	3
CO 4	3	2	3
CO5	3	3	3

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

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

Module No	Content	RBT Level
1	Introduction to 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.	7	15
	TOTAL	**45**	**100**

List of Practical(s):

Sr. No.	Name of Tutorial	Hours
1.	Implementation of Data & Descriptive Statistics-1.	02
2.	Implementation of Data & Descriptive Statistics-2.	02
3.	Implementation of Data & Descriptive Statistics-3.	04
4.	Implementation &Exploratory Data Analysis.	04
5.	Correlation Analysis	04
6.	Introduction to Probability	04
7.	Discrete and Continuous Probability Distribution-1.	02
8.	Discrete and Continuous Probability Distribution-2.	02
9.	Discrete and Continuous Probability Distribution-3.	02
10.	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 Pellillo Brase	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 categorical 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 Save point.	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
CO 1	Understand the importance of back-end design and relational database management system to provide database connectivity in applications.
CO 2	Discriminate physical data, conceptual data and its conversion into relational databases to perform normalization of data.
CO 3	Apply various database constraints on relational databases.
CO 4	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	2	1	1	1								
CO 2	2	1	1	1								
CO 3	2	1		1								
CO 4	2	1	1	1								
CO5	2		1	1								

Mapping of CO with PSO

SSCA1030	PSO1	PSO2	PSO3
CO 1	2	1	2
CO 2	2	1	2
CO 3	2	1	2
CO 4	3	2	2
CO 5	3	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	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 Queue, 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 Tutorial:

Sr No	Name of Tutorial	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	CharlesRiverMedia

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**
CO 1	Learn fundamentals of data structures and explain the concepts of array, stack in various applications.
CO 2	Apply different data structures for given problems.
CO 3	Apply sorting and searching algorithms to the small and large datasets.
CO 4	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	1	1										
CO 2	1	1		1								
CO 3	1	1	1	2								
CO 4	1	1	1	2	1							

Mapping of CO with PSO

SSCS1021	PSO1	PSO2	PSO3
CO 1	1	2	
CO 2	3	3	3
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 – Private Member Functions – Arrays within a Class - Memory	08	15

	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 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:

SSCS1031	OBJECT ORIENTED PROGRAMMING WITH C++
CO 1	Use advance features like temples and exception to make programs, standard template library for faster development.
CO 2	Use features of c++ like type conversion, inheritance, polymorphism, i/o streams and files to develop programs for real life problems.
CO 3	Develop the applications using object oriented programming with c++.
CO 4	Use advance features like temples and exception to make programs supporting reusability and template library for faster development.
CO 5	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		1		2			1
CO 5	2	3	2	2	3	2	3		2			2

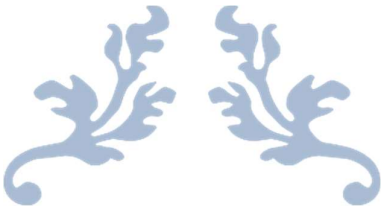
Mapping of CO with PSO

SSCS1031	PSO1	PSO2	PSO3
CO 1	1		
CO 2	3		
CO 3	2	2	
CO 4	3	2	
CO5	3	2	

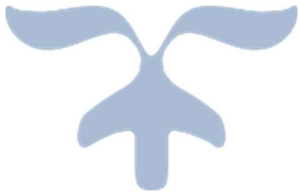
Level of Bloom's Revised Bloom's Taxonomy in Assessment

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.C.A.



P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION															
TEACHING & EXAMINATION SCHEME FOR BCA PROGRAMME AY: 2022-23															
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	SSCA2011	Relational Database Management System	CA	03	04	-	07	05	40	60	40	60	-	-	200
	SSCA2022	Core Java	CA	03	04	-	07	05	40	60	40	60	-	-	200
	SSCA2031	Web Application Design & Development-II	CA	01	04	-	05	03	-	-	100	00	-	-	100
	SSCA2040	E-Commerce	CA	03	02	-	05	04	40	60	40	60	-	-	200
	SSCS2010	Computer Networks	CS	03	02	-	05	04	40	60	40	60	-	-	200
						Total	**29**	**21**							**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
	SEPD3040	Integrated Personality Development Course-I	SEPD	02	-	-	02	01	100	00	-	-	-	-	100
	SSCA2910	Project-I	CA	-	04	-	04	02	-	-	100	00	-	-	100
		Elective - I	CA/CS	02	02	-	04	03	40	60	40	60	-	-	200
						Total	**29**	**20**							**1000**

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION															
TEACHING & EXAMINATION SCHEME FOR BCA PROGRAMME AY: 2022-23															
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**	
4	Elective - I														
	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
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Institute of Computer Science and Application
Department of Computer Application

Course Code: SSCA2011
Course Name: Relational Database Management System
Prerequisite Course(s): --SSCA1030 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	
03	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- To provide fundamentals of transaction processing.
- Learn to develop skills of procedural SQL programming for designing database applications.
- Understand the concepts of cursor and triggers in database application.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to PL/SQL** Introduction to PL/SQL (Definition & Block Structure), Variables, Constants and Data Types, Assigning Values to Variables, User Defined Record.	07	10
2.	**PL/SQL Conditional Statements** IF…THEN statement, IF. Else statements, multiple conditions, Nested IF statements, CASE statements	09	30
3.	**PL/SQL Iterative Statements** Iterative statements: Look. End Loop, For Loop, While Loop, EXIT Loop, Continue	06	10
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Working with Cursor** Overview of Cursor, Types of Cursors, Cursor Declaration, Cursors: OPEN CLOSE and FETCH, Cursor Attributes, Advantages and Disadvantages of Cursor	10	25
5.	**Exception Handling in PL/SQL** Introduction to Exception Handling, Types of Exceptions: Named System Exceptions, Unnamed System Exceptions, User-defined Exceptions, Exception Handling	07	10

6.	**PL/SQL Triggers** Triggers and their Features, Types of Triggers, Syntax for creating a trigger, Trigger Events, Trigger Creation, Implementation of BEFORE and AFTER Trigger'	06	15
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Implement SQL queries to perform various DDL Commands. (Create minimum 5 tables with different datatypes and operation).	06
2.	Implement SQL queries to perform various DML Commands. (Insert minimum 10 rows using different insert methods, edit and remove data using update and delete commands).	06
3.	Retrieve data using SELECT command and various SQL operators.	06
4.	Executing Data Conversion functions such as to_char (), To_Number () and To_date (). Execute various Date functions and also display special date formats using To_char () function.	08
5.	Executing Queries using the Select Command with Where, Having, Group by and order by clauses also execute the queries using aggregate functions	08
6.	Write the basic PL/SQL Programs and also Write a PL/SQL programs using if then else, for, while and nested loop	06
7.	Write a PL/SQL code to implement implicit and explicit cursors.	04
8.	Write PL/SQL Programs based on Exceptions handling. (Predefined and user-defined exceptions)	08
9.	Write PL/SQL code for creating Procedures, functions and database triggers.	08
	TOTAL	**60**

Reference Book (s):

Title	Author/s	Publication
Database System Concepts	Henry Korth	Tata McGraw Hil
SQL, PL/SQL the Programming language of Oracle	Ivan Bayross	BPB Publication
"An introduction to Database Systems"	C J Date	Pearson

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. At the end of the semester, the average of the entire practical will be converted to 20 marks.
- Internal Practical / 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:

SSCA2011	RELATIONAL DATABASE MANAGEMENT SYSTEM
CO 1	Understand the E R model and relational model.
CO 2	Learn and implement control and iterative statements of PL/SQL.
CO 3	Design user defined functions and stored procedures using procedural SQL.
CO 4	Demonstrate creating and executing of database triggers.
CO 5	Understanding and implementing the concept of exception handling in PL/SQL

Mapping of CO with PO

SSCA2011	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	2	1	2				1	3	2	1
CO 2	1	1	2	2	2	3			2	3	2	1
CO 3	2	2	1	2	3				1	1	2	2
CO 4	1	2	2	2	1	2			2	1		2
CO 5	2	2	2	2	3	2			3	2	2	2

Mapping of CO with PSO

SSCA2011	PSO1	PSO2	PSO3
CO 1	3	1	2
CO 2	1	3	2
CO 3	2	3	2
CO 4	1	2	3
CO5	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 PL/SQL	1,2
2	PL/SQL Conditional Statements	2,3
3	PL/SQL Iterative Statements	2,3
4	Working with Cursor	1,2,3
5	Exception Handling in PL/SQL	1,2,3
6	PL/SQL Triggers	2,3

P P Savani University
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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? Syntax 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 Bases 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 to showing usage of overloading and overriding.	02
4.	Implementation of java programs to demonstrate different access specifiers.	04
5.	Implementation of java programs using concept of inner classes.	04
6.	Implementation of java programs for variables, datatypes, operator.	04
7.	Implement of java programs for inheritance (single, multilevel, hierarchical).	04
8.	Implementation of java programs to demonstrate use of super keyword.	02
9.	Implementation of java programs for anonymous and abstract classes.	02

10.	Implementation of java programs for Interface.	02
11.	Implementation of java programs to demonstrate java packages.	02
12.	Implementation of java programs to use arrays and string.	06
13.	Implementation of java programs for exception handling using all keywords.	06
14.	Implementation of java programs to demonstrate life cycle of thread.	04
15.	Implementation of java programs for the concepts of thread priority, synchronization, 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 Horstmannand 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.
- 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:

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	3	2	2
CO 2	2	3	3
CO 3	3	3	1
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	Introduction	1, 2, 3
2	Introduction to Debugging	1, 2
3	Object Oriented Programming Fundamentals	1, 2, 3, 4
4	Java Environment and Data Types	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
School of Engineering
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**: Keyword, Constants and Variables, Datatypes-Declaration and initialization, basic input and output operations, symbolic constants	01	10
3.	**Operators and Expression** Arithmetic Operator, Increment and Decrement Operator, Assignment Operator, String Operator	02	10
4.	**Conditional statement and branching**: Decision Making & branching: Decision making with If & If ... Else statements, If - Else statements (Nested Ladder) and Looping: while statement, break statement & Do. While loop, FOR loop, FOR EACH, break and continue	03	25
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.	Data-base connectivity in PHP	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 webform to the MYSQL database -Display the data from MYSQL database in webform -Insert the data into MYSQL database using webform -Update the data present in MYSQL database using webform -Delete the data from MYSQL database using webform -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 ,My SQL	Michele Davis, Jon Phillips	'O'riley Press

Reference Book(s):

Title	Author/s	Publication
The Complete Reference PHP	Steven Holzner	TMH
Web Technologies BlackBook	Kogent Learning Solutions Inc.	Dreamtech 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 pe reach 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
CO5	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 Application

Course Code: SSCA2040
Course Name: E-Commerce
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	
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 basics of E-Commerce.
- learn Security and other issues in E-commerce.
- Get familiar with E-commerce business models and concepts, The internet and World Wide Web: Ecommerce, infrastructure.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**E-commerce and its Technological Aspects** Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce, Produce a generic framework for E-Commerce, Architectural framework of Electronic Commerce, Web based E Commerce Architecture.	07	14
2.	**Consumer Oriented E Commerce** E-Retailing: Traditional retailing and e retailing, Benefits of e retailing, Key success factors, Models of e retailing, Features of e retailing. E services: Categories of e-services, Web-enabled services, matchmaking services, Information-selling on the web, e entertainment, Auctions and other specialized services. Business to Business Electronic Commerce	8	18
3.	**Electronic Data Interchange:** Benefits of EDI, EDI technology, EDI standards, EDI communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System: Study and examine the use of Electronic Payment system and the protocols used, Study Electronic Fund	08	18

	Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify the methods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.		
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Security in E Commerce** Threats in Computer Systems: Virus, Cyber Crime Network Security: Encryption, Protecting Web server with a Firewall, Firewall and the Security Policy, Network Firewalls and Application Firewalls, Proxy Server.	15	20
5.	**Issues in E Commerce** Understanding Ethical, Social and Political issues in E-Commerce: A model for Organizing the issues, Basic Ethical Concepts, Analyzing Ethical Dilemmas, Candidate Ethical principles Privacy and Information Rights: Information collected at E-Commerce Websites, The Concept of Privacy, Legal protections Intellectual Property Rights: Types of Intellectual Property protection, Governance.	07	30
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Creating a Database, Installing WordPress, Installing Themes, downloading a Theme from the, WordPress Dashboard, Manually Installing a Theme, Adding Custom Header with Theme Name, Author, etc.	06
2.	Creating an Account on WordPress or at your own website/localhost, Logging into Your Account, Writing Your First Post with little explanation, Customizing Your Account, Personal Settings, General Settings	06
3.	Widgets, Editors, Writing Posts, adding a Post, Using the Visual Editor, Adding Hyperlinks, Categories, Tags, & Reading/Writing Settings, Using Categories and Tags, Managing Categories and Tags, Controlling the Number of Posts That Are Displayed, Understanding Comments, Managing and Moderating Comments, Trackbacks and Pingbacks	06
4.	Adding and Deleting a Page, Pasting from Text Files, Changing the Page Order, Adding and Managing Media, adding a Photo, adding a Video, Adding Other Content (.pdf, .doc, etc.), Managing Uploaded Content, Media Settings, Working with Links, Adding Links, Managing Links	06
5.	Changing the Header Image, Customizing the Sidebar with Widgets, Previewing Custom Fonts, Using the Dashboard, Managing Recent Comments, Tracking Statistics, Customizing the Dashboard's Appearance, Installing some important plugins,	06
	TOTAL	**30**

Reference Book (s):

Title	Author/s	Publication
E-Commerce : Business, Technology, Society	Kenneth C. Laudon	Pearson
E-Commerce: an Indian perspective	S. J. Joseph	PHI
Professional WordPress: Design and Development	Brad Williams, David Damstra, Hal Stern.	Paperback

Web Material Link(s):

- https://onlinecourses.nptel.ac.in/noc19_mg54/preview
- https://www.tutorialspoint.com/e_commerce/index.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. 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:

SSCA2040	E-COMMERCE
CO 1	Enumerate the technological changes in trade.
CO 2	Explain E-commerce on business models and strategy
CO 3	Interpret various terminologies of electronic commerce
CO 4	Explain various Security Risks with E-commerce.
CO 5	Implement the concept of web to develop websites related to e-commerce on WordPress.

Mapping of CO with PO

SSCA2040	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	2	2	1	2		1	1	1			1
CO 2		1	1	1	3							1
CO 3		2	1				1			1		2
CO 4		1	1	1		2	1	1		1		1
CO 5		2	1	2	3	2	1		1	1		1

Mapping of CO with PSO

SSCA2040	PSO1	PSO2	PSO3
CO 1	1	2	
CO 2	1	1	
CO 3	1	2	
CO 4			
CO5	2	1	2

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

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

Module No	**Content**	**RBT Level**
1	E-commerce and its Technological Aspects	1,2
2	Consumer Oriented E Commerce	2,3
3	Electronic Data Interchange:	2,3
4	Security in E Commerce	1,2,3
5	Issues in E Commerce	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 Sublayer** Channel Allocations, Multiple Access protocols-ALOHA, CSMA, CSMA/CD protocols, LAN architectures, IEEE802, 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, Internet working, 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 (2dig)& 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**

TextBook(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 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.
- 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:

SSCS2010	COMPUTER NETWORKS
CO 1	Understand packet switching architectures of networking reference models.
CO 2	Interpret the working of communication framework for tcp and udp protocols.
CO 3	Analyze the working of application layer protocols and its importance in networking.
CO 4	Identify the channel errors in solving networking problems.
CO 5	Articulate network framework using cisco packet tracer.

Mapping of CO with PO

SSCS2010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1		1	1		1					1
CO 2	2		1	1	1		1					
CO 3	1	2	1	1	2	2	1					
CO 4	2	1	1	1	1	2	1			1		
CO 5	2	2	1	2	2		1	1		1	2	1

Mapping of CO with PSO

SSCS2010	PSO1	PSO2	PSO3
CO 1	2	1	1
CO 2			1
CO 3	2		1
CO 4	1	1	2
CO5	2	1	2

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

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

Module No	Content	RBT Level
1	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 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, Text View, Buttons, Check Boxes, Radio Groups, Indicators, Seek Bar, 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.	04	16

5.	Drawing and Working with Animation Working with Canvases and Paints, Working with Text, Working with Bitmaps, Working with Shapes, Working with Animation.	10	08
Section II			
Module No.	Content	Hours	Weightage in%
6.	Android Storage APIs Working with Application Preferences such as Creating Private and Shared Preferences, Adding, Updating, and Deleting Preferences. Working with Files and Directories, Storing SQLite Database 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 Web View, Building Web Extensions using Web Kit, 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.	10	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 forDummies,3rdEdition	Donn Felker	Wiley Publication

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.
- 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:

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

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
CO5	2	3	3

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

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

Module No	Content	RBT Level
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, Theostrich 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** Main memory: Background, Swapping, Contiguous memory allocation, Segmentation, Paging, Structure of page table, 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; 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 performs ever al 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 Mc GrawHill

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 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.
- 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:

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
CO5	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.
- Developability 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 of Python, 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 elseif, 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 Tuples 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 Datatypes 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 using 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. Halterman	Pearson
Python Programming: A modular Approach	Sheetal Taneja, NaveenKumar	Pearson

Reference Book(s):

Title	Author/s	Publication
Python Cook book	David Ascher, Alex Martelli	OReilly

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 average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical:

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

Mapping of CO with PSO

SSCS2051	PSO1	PSO2	PSO3
CO 1	2		2
CO 2	2	1	2
CO 3	3		2

CO 4	3	1	2
CO5	3	1	2

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

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

Module No	**Content**	**RBT Level**
1	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 Application

Course Code: SSCA2910
Course Name: Project - I
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

- Identify, analyze, and articulate projects with a comprehensive and systematic approach.
- Develop creative thinking.
- Perform in a dynamic team.

Outline of the Project- I:

Sr.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 proposed 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 dasper suggested guidelines Consisting of 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.	Subject	Marks
1.	Selection of the topic (Within first30 Days of commencement of semester).	20
2.	Initial Presentation of the topic(Within 31 to 40 Days of commencement of semester).	20
3.	An actual work carried out.	20
4.	Report writing as per guidelines.	20
5.	Final Presentation & Question-Answer session.	20
	Grand Total :	**100**

Course Outcome(s):

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

SSCA2910	PROJECT-I
CO 1	Identify a problem in the domain of information technology and communication which requires in-depth investigation.
CO 2	Identify, discuss and justify the procedure, materials and technical aspects required for a project work.
CO 3	Formulate and implement innovative ideas in a concerned field.
CO 4	Work as an individual or in a team in development and execution of project

Mapping of CO with PO

SSCA2910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	2	1		2	2		3	1	1	3
CO 2	2	3	3	2	3	2	3	3	3	2	3	3
CO 3	2	2	3	3	3	2	3	3	2	3	3	3
CO 4	2	1	2	3	3	2	1	3	3	3	3	1

Mapping of CO with PSO

SSCA2910	PSO1	PSO2	PSO3
CO 1	2		
CO 2	3		3
CO 3	2	3	3
CO 4	3	3	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

- understandhowtocalculatetimecomplexityandspacecomplexityofanyalgorithm.
- 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, heapsort.	06	20
2.	**Divide and Conquer Algorithmic Design Method** Divide and conquer: basic algorithm and characteristics, Binary Search: 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, 0/1Knapsack Problem solving using DP method, Multi stage graphs, Optimal binary search trees, Travelling sales person problem.	06	18

5.	**Branch and Bound technique** Branch and bound: basic algorithm and characteristics, solving 4-queens,8-queens,n-queensusing branch &bound.	06	18
6.	**Hashing** The Symbol Table Abstract Datatypes, 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 back tracking.	02
13.	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. Rivestand CliffordStein	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 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.
- 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:

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
CO5	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			
Module No.	Content	Hours	Weightage in %
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.	Implementation of GUI Programming.	06
2.	Study and implementation of servlet programming.	04
3.	Study and implementation of cookies and session management.	04
4.	Study and implementation of java server page.	04
5.	Study and implementation of java server page implicit objects.	04
6.	Study and implementation of java server page action tags.	02
7.	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 be converted to 20marks.
- Internal viva consists of 20 marks.
- Practical performance /quiz/test consists of 30 marks.
- External viva consists of 30 marks.

Course Outcome(s):

SSCA2521	**ADVANCE JAVA**
CO 1	Learn and work with the web components of Java EE. i.e. the Servlet specification.
CO 2	Develop dynamic web application using Java Servlet and Java Server Pages technology.
CO 3	Implement the web based applications using effective data base access with rich client interaction with jdbc.
CO 4	Understand concepts related GUI Programming.

Mapping of CO with PO

SSCA2521	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	1		1	1		1				1	
CO 2	1	2	2	2	1		1			1		1
CO 3	1	2	2	2	1		1	1	1	2	2	2
CO 4	1	2	1	2	1	2	1	1	1	2	2	1

Mapping of CO with PSO

SSCA2521	PSO1	PSO2	PSO3
CO 1		1	
CO 2	2	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 Science

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			
Module No.	Content	Hours	Weightage in%
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 Data using 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**

TextBook(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 be converted to 20marks.
- 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:

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	Develop .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	2	1	1	1	1		1		2			
CO 2	1	2	2	2	1		1		3	1	2	
CO 3	2	2	2	2	1		1		2			
CO 4	2	2	2	2	1				3	1	2	

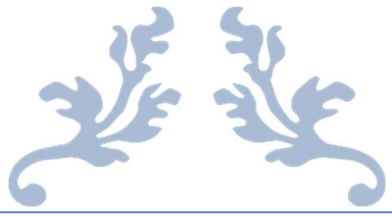
Mapping of CO with PSO

SSCS2510	PSO1	PSO2	PSO3
CO 1	1		
CO 2	1		
CO 3	1		
CO 4	1		

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

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

Module No	Content	RBT Level
1	Introduction to .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.C.A.

P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION																
TEACHING & EXAMINATION SCHEME FOR BCA PROGRAMME AY: 2022-23																
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	SSCA3910	Project/Summer Internship	CA	-	05	-	-	05	-	-	100	00	-	-	100
	SSCA3011	Internet of Things	CA	03	02	-	05	04	40	60	40	60	-	-	200
	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
	SEPD3050	Integrated Personality Development Course-II	SEPD	02	-	-	02	01	100	-	-	-	-	-	100
		Elective-II	CA/CS	02	02	-	04	03	40	60	40	60	-	-	200
						Total	**22**	**22**							**1000**
	SSCA3570	Online Course	CA	03	-	-	03	03	100	00	-	-	-	-	100
6	SSCA3920	Project/Training	CA	-	23	-	23	23	-	-	200	300	-	-	500
						Total	**26**	**26**							**600**
						Grand Total	**156**	**130**							**5000**

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING INSTITUTE OF COMPUTER SCIENCE AND APPLICATION															
TEACHING & EXAMINATION SCHEME FOR BCA PROGRAMME AY: 2022-23															
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

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

Course Code: SSCA3910
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	
-	05	-	05	-	-	100	00	-	-	200

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.	**Implementation** Implementation of the project in any of the programming languages

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
	Grant Total	**100**

Course Outcome(s):

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

SSCA3910	PROJECT/SUMMER INTERNSHIP
CO 1	Identify a problem in the domain of information technology and communication which requires in-depth investigation.
CO 2	Identify, discuss and justify the procedure, materials and technical aspects required for a project work.
CO 3	Formulate and implement innovative ideas in a concerned field.
CO 4	Work as an individual or in a team in development and execution of project

Mapping of CO with PO

SSCA3910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		2	1		1		1			2		1
CO 2		1	1	2				1			1	1
CO 3	2	1	1	1	1	2			1	1		1
CO 4	1	1	1	2	1				2	1		

Mapping of CO with PSO

SSCA3910	PSO1	PSO2	PSO3
CO 1	1	2	
CO 2		1	1
CO 3			1
CO 4			2

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

Course Code: SSCA3011
Course Name: Internet of Things
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 Internet of Things.
- Learn how boards and sensors work.
- Learn how to develop IoT applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Introduction to IoT** Introduction to Internet of things, Choosing right boards, selection of hardware and software.	06	06
2.	**Introduction to Arduino platform** The architecture of Arduino boards, types of boards, connections, LED patterns and C programming for Arduino.	06	20
3.	**Introduction to various Sensors** Sound sensors, DC motors, Touch, Temperature, Ultrasonic Gyroscope, Accelerometer, PIR.	06	12
4.	**Introduction to Raspberry Pi platform** Choosing a right board , IoT Device, Tools, Sensing IoT Environments.	05	12
SECTION II			
Module No.	Content	Hours	Weightage in%
5.	**IoT and iBeacons** Introduction to iBeacon, Hardware & Software, Connection to Serve, Classic distributed the problem.	04	14

6.	**IoT device connecting to the cloud** Introduction to the cloud for IoT, connecting IoT device to cloud, IOT on a global network.	06	14
7.	**RFID and MQTT** Introduction to RFID, MQTT, Hardware used for IoTRFID, Building MQTT server, Data on RFID Server.	06	14
8.	**IoT Security** IOT Security, Dangers, Assigning values to Information, Security Components, Key Management, Update Management.	06	08
	TOTAL	**45**	**100**

List of Practical :

Sr. No.	Name of Practical	Hours
1.	Introduction to IoT and Arduino Platform	04
	ThearchitectureofUNOR3Board	
	Blink LED Example	
2.	Connect multiple LED and Various Patterns in LED	04
3.	Introduction of Various sensors	06
4.	Connecting motorto Arduino board	
5.	PIR sensor example	04
6.	Accelerometer and gyroscope for Arduino	02
7.	Example of accelerometer and gyroscope	04
8.	Arduino Bluetooth & wifi connectivity	06
9.	Small Project Using Arduino board and sensors	08
10.	Introduction to Raspberry board-architecture and programming	02
11.	Installation of OS on RaspberryPi	04
12.	Basic Python programs, access GPIO	06
13.	Small Project using RaspberryPi and sensors.	10
	TOTAL	**60**

Text Book(s):

Title	Author/s	Publication
Beginning Arduino(2nd Edition)	Michael McRoberts	TIA
RaspberryPi IoT Projects	JohnC. Shovic	Apress

Reference Book(s):

Title	Author/s	Publication
Mastering Internet of Things: Design and create yourownIoTapplicationsusingRaspberryPi3	PeterWaher	Packt

Web Material Link(s):

- https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/
- https://www.tutorialspoint.com/internet_of_things/
- https://www.tutorialspoint.com/arduino/
- https://pythonprogramming.net/introduction-raspberry-pi-tutorials/

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 be converted to 20marks.
- 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:

SSCA3011	**INTERNET OF THINGS**
CO 1	Discuss the needs and importance of iot in solving real life issues.
CO 2	Demonstrate fundamentals of iot architecture, hardware, and software.
CO 3	Acquire the knowledge to program development boards, embedded iot devices & sensors.
CO 4	Gain the skill to utilize iot protocols to securely upload sensor data and control devices.
CO 5	Design iot application for wireless communications with cloud platforms.

Mapping of CO with PO

SSCA3011	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1	1				1					1
CO 2	2	2	2	2	2		2		1			1
CO 3		1	2	2	1	2	1	3	1	2	1	1
CO 4	2	2	1	2	2	2	1		1	2	1	
CO 5	2	2	1	2	1	2	3	1	2		1	

Mapping of CO with PSO

SSCA3011	PSO1	PSO2	PSO3
CO 1	1		
CO 2	1		2
CO 3	1		2
CO 4	2	2	2
CO5	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	Introduction to IoT	1, 2, 3
2	Introduction to Arduino platform	1, 2, 3, 4
3	Introduction to various Sensors	1, 2, 3, 4
4	Introduction to RaspberryPi platform	1, 2, 3
5	IoT and iBeacons	1, 2, 3, 4
6	IoT device connecting to the cloud	1, 2, 3, 4
7	RFID and MQTT	1, 2, 3, 4
8	IoT Security	1, 2, 3, 4

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 datasets.
- understandvariousDataVisualizationtechniquesandtheirapplications.

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: Bigdata, 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 Zumeland 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 consist software 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	Recognize the key concepts in data science, including their real world applications and the toolkit used by data scientists.
CO 2	Comprehend how data is collected, managed and stored for data science.
CO 3	Apply data science processes to an e commerce data and demonstrate the use of estimation methods for analysing this data.
CO 4	Compare and choose one data visualization method for effective visualization of data.
CO 5	Collect and manage data to devise solutions to data science tasks.

Mapping of CO with PO

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

Mapping of CO with PSO

SSCA3021	PSO1	PSO2	PSO3
CO 1			1
CO 2			1
CO 3	1	1	1
CO 4	1	1	1
CO5	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	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.
- 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 support software 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 Engineering Tasks, Requirement Gathering Techniques, Software Requirement Specification – Characteristics, Importance and Software Requirement Specification Document.	07	15

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**

Listo f 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.	
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 Hour	**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 recognize user requirements and develop srs (software requirement specification) for effective software design.
CO 3	Analyze 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
CO5	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 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, IdentityManagement 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 Hours	**30**

TextBook(s):

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

Reference Book(s):

Title	Author/s	Publication
Cyber Security	Nina Godbole, Sunit Belapure	Wiley India, New Delhi
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 performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/drawing/test 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:

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	-	03	40	60	40	60	-	-	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.	**Clustering:** Clustering Overview, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Partitioning Clustering-K-Means Algorithm, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Key Issues in Hierarchical Clustering, Strengths and Weakness, Outlier Detection.	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	PaulrajPonnian	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	3	2	1	1	1
CO 3	2	2	2	2	2	2	1	3	1	3	2	1
CO 4	3	2	3	3	3	2	3	3	3	2	3	3

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	3,4,5

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

Mapping of CO with PSO

SSCS3512	PSO1	PSO2	PSO3
CO1	2	3	2
CO2	3	2	1
CO3	2		2
CO4			
CO5			

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. Choose an appropriate operating system and machine configuration.	02
9.	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
10.	Case study on Google App. Engine	02
11.	Mini Task on Case Study any open system used for cloud.	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	Understand the fundamental principles of distributed computing.
CO2	Analyze the performance of Cloud Computing.
CO3	Learn the Concept of Cloud Infrastructure Model.
CO4	Understand the concept of Cloud Security.

Mapping of CO with PO

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

Mapping of CO with PSO

SSCS3520	PSO1	PSO2	PSO3
CO1	1	2	
CO2		1	1
CO3		1	
CO4	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	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 Application

Course Code: SSCA3570
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:

SSCA3570	**ONLINE COURSE**
CO1	Exercise and execute acquired knowledge within the chosen area of technology.
CO2	Learn from experts from IITs.
CO3	Formulate and implement innovative ideas in a concerned field.
CO4	Implement innovative ideas with the application.

Mapping of CO with PO

SSCA3570	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	3	2	3	3	3	3		3	3	3
CO 2		1	1				1	3				1
CO 3	3	2	3	3	3	2	3	1	3	2	2	3
CO 4	3	3	2	2	2	2	2	1	1	1	2	

Mapping of CO with PSO

SSCA3570	PSO1	PSO2	PSO3
CO1	2	3	1
CO2			2
CO3	3	3	3
CO4	3	1	3

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

Course Code: SSCA3920
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
					ESE	CE	ESE	CE	ESE	
-	23	-	23	-	-	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:

SSCA3920	**PROJECT/TRAINING**
CO 1	Gain knowledge and implement various tools, techniques and framework which would be helpful in software project development and management.
CO 2	Design and develop innovative system/application by applying the knowledge gained from various courses undergone in the earlier years.
CO 3	Implement and execute the complete project life cycle and the project time estimation & its management.
CO 4	Evaluate and analyze both analytical and synthetically skills while working in various phases of software project development.
CO 5	Develop habit of working in a team.

Mapping of CO with PO

SSCA3920	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	3	3	3
CO 3	2	3	3	3	2	3	3	1	3	3	3	3
CO 4	3	2	3	3	3	2	2	1	2	3	2	2
CO 5	1	3	2	2	2	2	2	3	3	2	2	3

Mapping of CO with PSO

SSCA3920	PSO1	PSO2	PSO3
CO1	3	2	2
CO2	3	3	3
CO3	3	3	3
CO4	1	3	2
CO5	2	3	2