Syllabus Book

B. Sc (IT)

(Offered under School of Sciences)

P P Savani University

Host Institute: School of Engineering

Effective From: 2022-23

Authored by: P P Savani University

CONTENT

FIRST YEAR B. SC. (IT)

P P SAVANI UNIVERSITY														
SCHOOL OF ENGINEERING														
TEACHING & EXAMINATION SCHEME FOR FIRST YEAR B. SC. (IT) PROGRAMME AY: 2022-23														
Sem.	Course Code	Course Name	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	3	0	2	5	5	40	60	0	0	50	0	150
	SSIT1010	Introduction to Computer Programming	3	4	0	7	5	40	60	40	60	0	0	200
	SSIT1020	Web Application Design	1	2	0	3	2	50	0	50	0	0	0	100
	SSIT1030	Computer Applications	2	2	0	4	3	50	0	50	0	0	0	100
	SEHV1010	Universal Human Values	2	0	0	2	0	100	0	0	0	0	0	100
						Total	**21**	**15**						**650**
2	SESH1061	Discrete Mathematics for Computer Applications	3	0	2	5	5	40	60	0	0	50	0	150
	SSIT1040	Data Structures	3	2	0	5	4	40	60	20	30	0	0	150
	SSIT1061	Web Application Development	1	2	0	3	2	50	0	50	0	0	0	100
	SSIT1071	Object Oriented Programming with JAVA	3	4	0	7	5	40	60	40	60	0	0	200
	CFLS1010	Linguistic Proficiency	2	0	0	2	2	40	60	0	0	0	0	100
						Total	**22**	**18**						**700**

P P Savani University
School of Sciences

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	00	02	02	40	60	00	00	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.	**Set, Relation and Function** Basics of Set Theory, Operations on Sets, Relation, Properties of Relation, Equivalence Relation, Hasse Diagram, Introduction to Function, Types of Functions, Exponentials, Logarithms, Rational Functions, Composition of function, Inverse function.	07	16
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Elementary Combinatorics** Introduction, Basic Counting Principles, Permutation and Combination, Mathematical Induction.	06	14
2.	**Determinants**	08	17

	Formation of Determinants, Minors and Cofactors of the Elements of a Determinant, Properties of Determinants, Application of Determinants in Computer Science, Cramer's Rule.		
3.	**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

List of Tutorial(s):

Sr. No.	Name of Tutorial	Hours
1.	Number System-1	2
2.	Number System-2	4
3.	Mathematical Logic	4
4.	Set, Relation and Function-1	2
5.	Set, Relation and Function-2	4
6.	Elementary Combinatorics	4
7.	Determinants-1	2
8.	Determinants-2	4
9.	Analytical Geometry-1	2
10.	Analytical Geometry-2	2

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
Analytical Geometry: 2D and 3D	P R Vittal	Pearson
Discrete Mathematical Structures with Applications to Computer Science	J. P. Tremblay, R. Manohar	Tata McGraw Hill
Introduction to Computer Science	ITL ESL	Pearson

Web Material Link(s):

- 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 tutorial and average of the same will be converted to 30 marks.
- MCQ examination/Application based small project report writing of 10 marks.
- Internal viva consists of 10 marks.

Course Outcome(s):

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

- convert decimal to binary, hexadecimal and 2's complement data representation; perform arithmetic operations like addition, subtraction, division and multiplication.
- use concepts of set theory for understanding & fetching data from database using query.
- apply permutations and combinations on given set of data.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT1010
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	00	05	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Computer Programming** Introduction to programs, its significance, classification of programming language, Selection of a programming language.	02	04
2.	**Introduction to C Programming** Features of C language, structure of C Program, Development of program, Algorithm and flowchart, Types of errors, debugging, tracing/stepwise execution of program, watching variables values in memory.	07	16
3.	**Constants, Variables and Data Types** Character Set, C tokens, Keywords, Constants and Variables, Data types in C programming, typedef, enum, basic input and output operations.	06	15
4.	**Operators and Expression and Managing I/O Operations** Introduction to Operators and its types, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Operator precedence and associatively. Input and output of different types of data in C language, a character, formatted input, formatted output.	07	15
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Conditional Statements and Branching** Decision Making & branching: Decision making with if &if ... else statements, if - else statements (Nested Ladder), The Switch & go-to	06	16

	statements, The turnary (? :) Operator Looping: The while statement, The break statement & The Do. While loop, The FOR loop, Jump within loops - Programs.		
2.	**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.	06	15
3.	**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.	06	15
4.	**Pointers** Introduction to pointers, Declaration, Initialization, Pointer to pointer, Pointer and array.	05	04

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….while loop	06
11.	Implement C program using for loop for different problems	04
12.	Implement C program using loops to 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

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	Reema Thareja	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 completion of the course, the student will be able to

- learn the fundamentals of programming.
- develop efficient programs with their own logic & capabilities.
- understand the syntax and semantics of the 'C' language.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT1020
Course Name: Web Application Design
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	02	00	03	50	00	50	00	00	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	05	10
2.	**HTML** HTML Basics, HTML Attributes, HTML Headings, HTML Paragraphs, HTML Styles, HTML Text Formatting, HTML Links, HTML Images	05	20
3.	**CSS** CSS Syntax, CSS Colors, CSS Background, CSS Border, CSS Margin, CSS Box Model, CSS Text, CSS Fonts.	05	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**JavaScript** Syntax of JavaScript, external file, folder, URL, JavaScript Statements, JavaScript Variables, JavaScript Arithmetic, JavaScript String Concatenation, JavaScript Datatypes, JavaScript Functions, JavaScript different methods.	08	25
2.	**Bootstrap CSS** Introduction to Bootstrap CSS, Content Delivery Network, Bootstrap classes.	07	25

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.	04
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.	08

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	Riwanto Megosinarso	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:

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 completion of the course, the student will be able to

- learn the fundamentals of Website designing.
- apply knowledge of HTML, CSS, and JavaScript to build static and dynamic websites.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT1030
Course Name: 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	
02	02	00	03	50	00	50	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand various components of a computer.
- learn assembling and dissembling of computer hardware.
- learn and apply various office automation tools.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Computer and its Architecture** Introduction and Characteristics, Generation, Classification, Applications, Introduction to various components of computer hardware, input / output peripherals, Central Processing Unit, Communication between various units, processor speed.	05	15
2.	**Memory** Introduction to Memory, Memory hierarchy, Primary memory and its type, Secondary memory, Classification of Secondary memory, Various secondary storage devices and their functioning, their merits and demerits, Concept of Main memory, Auxiliary Memory, Associative Memory, Cache Memory and Virtual Memory.	05	20
3.	**Software** Introduction of different types of software and its installations.	05	15
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Device Drivers, Dual booting and virtualization** Installation of device drivers and other required software, need and method of backup, introduction to dual booting, its significance, concept of virtualization.	03	10
2.	**Internet and Security Issues** Computer network, topology, LAN, MAN, WAN, Advantages, Basic security issues: Computer viruses, malware, trojan horse etc.	03	15

3.	**Various Processing Tools** Various word processing tools: spreadsheet, presentation etc., various development tools: flow, animation, website development tools etc.	09	25

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to different hardware components of PC and Assembling of PC.	01
2.	Installation of OS and other Softwares. and understanding Dual Booting.	01
3.	Understanding LAN connections.	01
4.	Understanding how to create bootable pen drive.	01
5.	Working with browsers, internet, email, google drive etc.	01
6.	Working with Microsoft Word to create simple document and applying various types of font formatting features.	01
7.	Working with Microsoft Word to insert different objects like pictures, links, files and other objects in a document.	04
8.	Create a Flier using Microsoft Word.	02
9.	Working with Microsoft Excel to understand basic features like creating numerical database, applying simple formulas using =.	04
10.	Create a Grade sheet in Microsoft Excel.	02
11.	Create a Pivot table and Pivot chart for the given data: Order ID, Product, Category, Amount, Date and Country.	02
12.	Creating presentation template using Microsoft Presentation.	04
13.	Create a presentation including features like Master Slide, animation, rehearse time, custom animation and other suitable features	02
14.	Create a presentation for celebration of any event in your college.	02
15.	Draw a Flowchart for any C program using Flowchart Development Tool (For example: Edraw)	01
16.	Learning Virtualization using VMware	01

Text Book(s):

Title	Author/s	Publication
Structured Computer Organization	Andrew S. Tanenbaum	Pearson
Computer Network Fundamentals & Application	R. S. Rajesh, K. S. Easwarakumar, R. Balasubramanian	Vikas
Computer Science	ITL Education Solutions Limited	Pearson
Upgrading and repairing PCs	Scott Mueller	Pearson Education

Reference Book(s):

Title	Author/s	Publication
The Complete PC upgrade and Maintenance guide	Mark Minasi	Sybex
Computer Hardware: installation, interfacing, troubleshooting, and maintenance	James, K. L.	PHI Learning
Computer Architecture and Organization	John P. Hayes	McGraw Hill

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 20 marks as per the guidelines provided by Course Coordinator.

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 25 marks.
- Internal viva and performance consists of 25 marks.

Course Outcome(s):

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

- design assemble and disassemble computer components.
- install various software and hardware.
- apply and design various office automation applications.

P P Savani University
School of Sciences

Department of Science & Humanities

Course Code: SESH1061
Course Name: Discrete Mathematics for Computer Applications
Prerequisite Course(s): Mathematics for Computer Applications (SESH1040)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- to extend concepts of set theory by study of lattice and group.
- to apply knowledge of discrete mathematics for problem solving skills necessary to succeed in design and analysis of algorithms, database management, software engineering and computer networks.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Matrix Algebra** Introduction, Types of Matrices, Operations of Matrices, Adjoint Matrices, Solution of System of Equations by Matrix Inversion Method, Applications of Matrix.	07	18
2.	**Lattices** Definition & properties of Lattice, Lattices as Algebraic System, Sublattices, Types of lattices, Distributive lattices, Modular lattices, Complemented lattices, Bounded lattices, Complete lattices.	07	16
3.	**Group Theory** Binary operations, Properties of Group, Groupoid, semigroup & monoid, Abelian group, Subgroup, Cosets, Normal subgroup, Lagrange's theorem, Cyclic group, Permutation group, Homomorphism & Isomorphism of groups.	08	16
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Tree** Introduction to trees, Properties of tree, Distance and centre in tree, Rooted tree, Binary tree, Tree Traversal.	07	14
2.	**Spanning Tree** Introduction to Spanning tree, DFS, BFS Algorithm, Minimum Spanning Tree, Prim's and Kruskal's Algorithm, Application of Spanning Trees.	07	18

3.	**Graph Theory** Formation of graph, Basic terminologies of directed and undirected graphs, Matrix representation of graphs (Adjacency Matrix and Incidence Matrix), Isomorphism, Walk, Path, Circuit, Euler Path and Circuit, Hamilton Path and Circuit, Shortest path problem, Dijkstra's Algorithm.	09	18

List of Tutorial(s):

Sr. No.	Name of Tutorial	Hours
1.	Matrix Algebra-1	02
2.	Matrix Algebra-2	04
3.	Lattices	04
4.	Group Theory -1	02
5.	Group Theory -2	04
6.	Tree	04
7.	Spanning Tree-1	02
8.	Spanning Tree-2	02
9.	Graph Theory-1	04
10.	Graph Theory-2	02

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. Tremblay R. Manohar	Tata McGraw Hill

Web Material Link(s):

- http://nptel.ac.in/courses/106106094/
- http://nptel.ac.in/downloads/111104026/

Course Evaluation:

Theory:

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

Tutorial:

- Continuous evaluation consists of performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 30 marks.
- MCQ examination/Application based small project report writing of 10 marks.
- Internal Viva consists of 10 marks.

Course Outcome(s):

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

- determine need of matrices in image processing, computer graphics and cryptography.
- apply knowledge of group theory for data encryption.
- design and use foundational concepts of notations and results of graph theory in information storage and retrieval.
- apply the basic concepts of spanning tree algorithm namely DFA, BFS, prim's and Kruskal's in design of networks.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT1040
Course Name: Data Structures
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
				Theory		Practical		Tutorial		
Theory	Practical	Tutorial	Credit	CE	ESE	CE	ESE	CE	ESE	Total
03	02	00	04	40	60	20	30	00	00	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.	04	10
2.	**Array** Array Representation, Array as an Abstract Data Type, Programming Array in C, Sparse Matrices, Sparse Representations and its Advantages, Row-measure Order and Column-measure Order representation.	05	10
3.	**Searching and Sorting** Linear Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Radix sort.	05	10
4.	**Stack and Queue** Stack Definition and concepts, Operations on stack, Programming Stack using Array in C, Prefix and Postfix Notations and their Compilation, Recursion, Tower of Hanoi, Representation of Queue, Operation on Queue, Programming Queue using Array in C. Types of Queue, Applications of Stack & Queue.	08	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Linked List-Part I** Dynamic Memory Allocation, Structure in C, Singly Linked List, Doubly Linked List, circular linked list.	06	14

2.	**Linked List-II and Applications of Linked List** Linked implementation of Stack, Linked implementation of Queue, Applications of Linked List.	06	14
3.	**Trees** Tree Definition, concepts and Representation. Binary Tree, Binary Tree Traversals, conversion from general to binary Tree. Threaded Binary Tree, Heap, Binary Search Tree, 2-3 Tree, AVL tree.	07	15
4.	**Graphs** Graph Definition, Concepts and Representation, Types of Graphs	04	07

List of Practical:

Sr No	Name of Practical	Hours
1.	Introduction to Dynamic Memory Allocation	02
2.	Revision of Structures in C	02
3.	Write a program to perform Insertion sort.	02
4.	Write a program to perform Selection sort.	02
5.	Write a program to perform Insertion sort.	02
6.	Write a program to perform Bubble sort.	02
7.	Write a program to perform Linear Search sort.	02
8.	Write a program to perform Binary Search sort.	02
9.	Write a program to implement stack and perform push, pop operation.	02
10.	Write a program to perform the following operations in linear queue – Addition, Deletion and Traversing.	02
11.	Write a program to perform the following operations in circular queue – Addition, Deletion, and Traversing.	02
12.	Write a program to perform the following operations in singly linked list – Creation, Insertion, and Deletion.	02
13.	Write a program to perform the following operations in doubly linked list – Creation, Insertion, and Deletion.	02
14.	Write a program to create a binary tree and perform – Insertion, Deletion, and Traversal.	02
15.	Write a program to create a binary search tree and perform – Insertion, Deletion, and Traversal.	02

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 completion of the course, the student will be able to

- differentiate primitive and non-primitive structures.
- design and apply appropriate data structures for solving computing problems.
- implement different data structures.
- apply sorting and searching algorithms to the small and large data sets.
- analyze algorithms for specific problems.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT1061
Course Name: Web Application Development
Prerequisite Course(s): Web Application Design (SSIT1020)

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	02	00	02	50	00	50	00	00	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, Data types - 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: The while statement, The break statement & The Do. While loop, The FOR loop, FOREACH, break and continue	03	25
SECTION II			
Module No.	Content	Hours	Weightage in %
1.	**User-Defined Functions** prototypes, definition of function, parameters, parameter passing, calling a function, recursive function, in-built functions	01	10

2.	**Arrays and Strings:** Introduction to array, Numeric Array, Associative Array and Multi-dimensional Array, in-built string functions	02	10
3.	**PHP Forms** $_GET and $_POST function	02	10
4.	**Data-base connectivity in PHP**	03	20

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	2
2.	Static Keyword in PHP – Example, ECHO and PRINT statements in PHP – Example, strlen() and strpos() functions – Example	2
3.	Example on Arithmetic Operators, Increment and Decrement Operators, Assignment Operators and String Operators	2
4.	Example on Conditional Statements (if, if…else Statement, if…elseif…else and Switch)	2
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	2
6.	User Defined Function Example (How to Adding parameters and How to Return values?). Date () and time() function in PHP – Example	2
7.	Array in PHP Numeric array in PHP – Example Associative array in PHP – Example Loop through an Associative array Multidimensional array in PHP – Example	4
8.	PHP Forms The $_GET Function - Example The $_POST Function – Example PHP Global Variables – Superglobals $_GLOBALS – Example $_SERVER – Example	4
9.	How to connect to MYSQL database using PHP -The functions used to connect web form to the MYSQL database -Display the data from MYSQL database in web form -Insert the data into MYSQL database using web form -Update the data present in MYSQL database using web form -Delete the data from MYSQL database using web form -Using Cookies with PHP	6
10.	A simple GUI based web-application development using PHP -Finalization of topic -Analysis of problem -Design of GUI -PHP Implementation -Testing -Final Evaluation	4

Text Book(s):

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

Reference Book(s):

Title	Author/s	Publication
The Complete Reference PHP	Steven Holzner	TMH
Web Technologies Black Book	Kogent Learning Solutions Inc.	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 per each practical. At the end of the semester, the average of the entire practical will be converted to 20 marks.
- Submission of project developed as per the guidelines of the course coordinator at the end of the semester consists of 30 marks.

Course Outcome(s):

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

- understand structure of open source technologies.
- learn advance web technology concepts.
- prepare industry ready professionals in the field of web technology.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT1071
Course Name: Object Oriented Programming with Java
Prerequisite Course(s): Introduction to Computer Programming (SSIT1010)

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	00	05	40	60	40	60	00	00	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 Byte code.	03	05
2.	**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
3.	**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.	05	10
4.	**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
5.	**Java Packages** Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASSPATH Setting for Packages,	02	05

	Making JAR Files for Library Packages, Import and Static Import, Naming Convention for Packages.		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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.	04	10
2.	**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.	05	10
3.	**Thread** Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads.	06	15
4.	**Applet** Applet & Application, Applet Architecture, Parameters to Applet.	03	5
5.	**Input Output Operations in Java** Streams and the new I/O Capabilities, Understanding Streams, The Classes for Input and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File, Channel, Serializing Objects.	05	10

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, data types, 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.	04
14.	Implementation of java programs to demonstrate life cycle of thread.	02
15.	Implementation of java programs for the concepts of thread priority, synchronization, inter- thread communication.	06
16.	Implementation of Applets, AWT and Web Servers.	06
17.	Implementation of file handling operations.	04

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

- learn the fundamentals of object-oriented programming.
- develop efficient programs with their own logic & capabilities.
- understand the syntax and semantics of the 'Java' language.

SECOND YEAR B. SC. (IT)

P P SAVANI UNIVERSITY														
SCHOOL OF ENGINEERING														
TEACHING & EXAMINATION SCHEME FOR SECOND YEAR B. SC. (IT) PROGRAMME														
Sem.	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Contact Hours				Credit	Theory		Practical		Tutorial		Total
			Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
3	SSIT2910	Industrial Exposure	2			0	2	0	0	100	0	0	0	100
	SESH2060	Statistics	3	0	2	5	5	40	60	0	0	50	0	150
	SSIT2010	Computer Networks	3	2	0	5	4	40	60	20	30	0	0	150
	SSIT2020	Programming with Python	2	4	0	6	4	40	60	40	60	0	0	200
	SSIT2030	Software Lab	0	2	0	2	1	0	0	100	0	0	0	100
	SSIT2070	Database Management Systems	3	4	0	7	5	40	60	40	60	0	0	200
	CFLS1020	Global Communication Skills	2	0	0	2	2	40	60	0	0	0	0	100
					Total	**27**	**23**							**1000**
4	SSIT2040	Operating Systems	3	2	0	5	4	40	60	20	30	0	0	150
	SSIT2051	Internet of Things	2	4	0	6	4	40	60	40	60	0	0	200
	SSIT2060	Mobile Application Development	2	4	0	6	4	40	60	40	60	0	0	200
	SSIT2920	Project – I	4			4	4	0	0	100	0	0	0	100
	SEPD3040	Integrated Personality Development Course – I	2	0	0	2	1	100	0	0	0	0	0	100
		Elective-I	2	2	0	4	3	40	60	20	30	0	0	150
					Total	**27**	**20**							**900**

Offered from Sem.	Course Code	Department Elective Course Title	Teaching Scheme					Examination Scheme						
			Contact Hours				Credit	Theory		Practical		Tutorial		Total
			Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
4	SSIT2510	Enterprise Resource Planning	2	0	1	3	3	40	60	0	0	50	0	150
4	SSIT2520	Design & Analysis of Algorithms	2	2	0	4	3	40	60	20	30	0	0	150
4	SSIT2530	Digital Marketing	2	0	1	3	3	40	60	0	0	50	0	150

P P Savani University
School of Sciences

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	00	02	05	40	60	00	00	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 Data Sciences.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Data & Descriptive Statistics** Elements, Variables and Observations Scale of Measurement, Cross Sectional and Time Series Data, Qualitative Data and Quantitative Data, Frequency Distribution, Relative Frequency and Percent Frequency Distributions, Bar Charts and Pie Charts, Dot Plot, Histogram, Ogive, Measure of Location: Mean, Median and Mode for Individual series, Discrete Frequency Distribution and Continuous Frequency Distribution, Percentiles & Quartiles, Measure 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 %
1.	**Introduction to Probability** Experiments, Counting Rules, and Assigning Probabilities, Events and their Probabilities, Relationships of Probability, Conditional Probability, Bayes' Theorem.	06	10
2.	**Discrete and Continuous Probability Distribution** Random Variables, Discrete Probability Distributions, Expected Value and Variance, Binomial Probability Distribution, Poisson Probability Distribution, Uniform Probability Distribution, Normal Probability Distribution.	10	25
3.	**Testing of Hypothesis** Introduction, Sampling, Tests of significance for parametric test, Null Hypothesis, Type 1 and Type 2 errors, Level of significance, Chi-square test, Student's t-test, Seducer's f-test.	07	15

List of Tutorial(s):

Sr. No.	Name of Tutorial	Hours
1.	Data & Descriptive Statistics-1.	2
2.	Data & Descriptive Statistics-2.	2
3.	Data & Descriptive Statistics-3.	4
4.	Exploratory Data Analysis.	4
5.	Correlation Analysis.	4
6.	Introduction to Probability.	4
7.	Discrete and Continuous Probability Distribution-1.	2
8.	Discrete and Continuous Probability Distribution-2.	2
9.	Discrete and Continuous Probability Distribution-3.	2
10.	Testing of Hypothesis.	4

Text Book(s):

Title	Author/s	Publication
Statistics for Business and Economics	Anderson, Sweeney and Williams	Cengage Learning

Reference Book(s):

Title	Author/s	Publication
Probability and statistics for Computer Science	James L. Johnson	Wiley Publication
Quantitative Methods	Nazneen Khan Sarguroh, Dr. Abhilasha S. Magar, Prof. Rajiv S. Mishra	Himalaya publishing House

Web Material Link(s):

- https://nptel.ac.in/courses/111105041/
- https://nptel.ac.in/courses/111105090/

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.

Tutorial:

- Continuous evaluation consists of performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 30 marks.
- MCQ examination/Application based small project report writing of 10 marks.
- Internal viva consists of 10 marks.

Course Outcome(s):

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

- recognize elements and variable in statistics and summarize qualitative and quantitative data.
- calculate mean, median and mode for individual series, Discrete Frequency Distribution and Continuous Frequency Distribution.
- outline properties of correlation and compute Karl-Pearson's coefficient of correlation.
- apply concept of hypothesis testing for analyzing data.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2010
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	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

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

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and 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 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 during End Semester Examination.
- Viva/Oral performance consists of 15 marks during End Semester Examination.

Course Outcome(s):

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

- understand the basics of data communication.
- work with various types of computer networks.
- understand the concepts of protocols, network interfaces, and performance issues in networks.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2020
Course Name: Programming with Python
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	04	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Introduction to Python, History, Features and Applications 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.	01	04
3.	**Python Program Flow Control** Conditional blocks using if, else and else if, Simple for loops in Python, for loop using ranges, use of while loops in Python, Loop manipulation using pass, continue, break and else.	04	12
4.	**Python String, List, Tuple, Set and Dictionary Manipulation** String in Python and its built-in methods, List & Dictionary manipulation, Functions & methods for Tuple and Sets.	08	28
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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

2.	**Files in Python** Introduction to file input and output, Writing Data to a File, Reading Data from a File, using loops to process files.	02	06
3.	**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
4.	**Exception Handling in Python** Introduction to Exception and Errors, The Exception Handling mechanism in Python.	02	06

List of Practical:

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

Text Book(s):

Title	Author/s	Publication
Learning to Program with Python	Richard L. Halter man	Pearson
Python Programming: A modular Approach	Sheetal Taneja, Naveen Kumar	Pearson

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and 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 completion of the course, the student will be able to

- understand the syntax and semantics of the Python language.
- develop efficient programs with their own logic & capabilities.
- learn added features of using Python in real life applications.
- learn and develop small application.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2030
Course Name: Software Lab
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
00	02	00	01	00	00	100	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help the learners to
- learn new tools as per recent trends in the industry.
- develop small software modules.

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

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

Any emerging tools/software based on industry requirement.

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

Course Outcome(s):
After completion of the course, the student will be able to
- apply practical knowledge for project development of a real time application.
- explore the technological advancements in the field of Information Technology.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2070
Course Name: Database Management Systems
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	00	05	40	60	40	60	00	00	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.	**SQL Concepts** Basics of SQL, DDL,DML,DCL, Structure: creation, alteration, Defining constraints: Primary key, Foreign key, Unique key, Not null, check, IN operator, Aggregate functions , Built-in functions: numeric, date, string functions, set operations, Sub queries, correlated sub-queries: Join, Exist, Any, All, view and its types. Transaction Control Commands- Commit, Rollback, Save point.	10	22
4.	**Query Processing**	04	08

	Overview, Measures of query cost, Selection operation, Sorting, join, Evaluation of expressions.		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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
2.	**Database Design Concepts** Functional Dependency, Definition, Trivial and non-trivial FD, Closure of FD set, closure of attributes, Irreducible set of FD, Normalization: 1NF, 2NF, 3NF, Decomposition using FD, Dependency preservation, BCNF, Multivalued dependency, 4NF Join Dependency and 5NF, RAID Concepts.	07	14
3.	**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.	05	10
4.	**PL/SQL Concepts** Cursors, Stored Procedures, Stored Function, Database Triggers, Indices.	03	06

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 tightVNC Server and Client software (remote access of a server by clients)	02
3.	Introduction to Data Dictionary concepts.	02
4.	Create all the master tables using Data Definition Language Commands like Create and Describe.	02
5.	Implement the use of alter table command.	02
6.	Introduction to Transaction Control Commands like Commit, Rollback and Savepoint.	02
7.	Use insert command to add data into created tables.	02
8.	Solve queries using update command.	02
9.	Implement SQL queries based on update and delete command.	02
10.	Write SQL queries to solve problems with use of select command.	02
11.	Generate different reports using select command.	02
12.	Introduction to SQL functions.	02

13.	Write the required SQL scripts to implement the listed queries, which require the usage of numerous SQL functions.	02
14.	Introduction to group functions and demonstration of their usage.	02
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.	02
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.	02
23.	Write SQL script to solve the questions based on all SQL concepts.	02
24.	Write the required SQL scripts to implement all the listed queries using Data Control Commands like Grant and Revoke.	02
25.	Introduction to different objects in SQL and create views based on given scenarios.	02
26.	Write the required SQL script to implement the given triggers.	02
27.	Write the required SQL script to implement the given triggers.	02
28.	Write the required SQL script to implement the given functions and procedures using PL/SQL block scripts.	02
29.	Write the required SQL scripts to implement the given cursors.	02
30.	Submission of DBMS Mini Project Design.	02

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 completion of the course, the student will be able to

- convert physical, data, conceptual data into relational databases.
- utilize database design for the development of software projects.
- apply various data base constraints on relational databases.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2910
Course Name: Industrial Exposure
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

- get exposed to the industrial spectrum.
- learn the mechanisms of industry/ workplace.
- be aware about work culture and policies of industries.

Outline of the Course:

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

Course Evaluation:

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

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

- get acquainted with the industrial scenario.
- be aware about his future prospects in the respective field.
- gain knowledge of work culture and industrial expectations.

Report Writing Guidelines

A. Report Format:

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

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

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

2. Project Certification Form
   [The form should be duly filled signed by the supervisors.]
3. Acknowledgements
   [All persons (e.g. supervisor, technician, friends, and relatives) and organization/authorities who/which have helped in the preparation of the report shall be acknowledged.]
4. Table of Contents/Index with page numbering
5. List of Tables, Figures, Schemes
6. Summary/abstract of the report.
7. Introduction/Objectives of the identified problem
8. Data Analysis and Finding of Solution
9. Application of the identified solution
10. Future Scope of enhancement of the Project and Conclusion
11. "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
12. References(must)
13. Bibliography
14. Annexures (if any)

B. Guideline for Report Formatting:

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

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2040
Course Name: Operating Systems
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- learn the principles of operating system design.
- understand architecture of computer based operating systems and its components.
- understand various software and hardware processes and its life cycle.

Course Content:

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

Section II			
Module No.	Content	Hours	Weightage in %
1.	**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
2.	**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
3.	**File Systems** Introduction; Files: naming, structure, types, access, attributes, operations.	03	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Study of basic commands of Linux.	02
2.	Study of Advance commands and filters of Linux/UNIX.	02
3.	Write shell scripts to perform several computations like add and subtract numbers, find average, percentage. Also find factorial of a given number. Generate Fibonacci series etc.	04
4.	Simulate CPU scheduling algorithms (E.g. FCFS, SJF, Round Robin etc.).	06
5.	Simulate contiguous memory allocation techniques (E.g. Worst-fit, Best-fit, Next-fit, and First-fit).	04
6.	Simulate Banker's algorithm for deadlock avoidance.	04
7.	Simulate page replacement algorithms (E.g. FIFO, LRU, Optimal).	04
8.	Simulate disk scheduling algorithms (E.g. FCFS, SCAN, C-SCAN).	04

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and 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 per each practical and 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 during End Semester Examination.
- Viva/Oral performance consists of 15 marks during End Semester Examination.

Course Outcome(s):

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

- learn the fundamentals of Operating System design.
- understand and differentiate various operating system architectures and its interfaces.
- perform inter-process communication.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2051
Course Name: Internet of Things
Prerequisite Course(s): Programming with Python (SSIT2020)

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	04	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the 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.	03	06
2.	**Introduction to Arduino platform** The architecture of Arduino boards, types of boards, connections, LED patterns and C programming for Arduino.	04	20
3.	**Introduction to various Sensors** Sound sensors, DC motors, Touch, Temperature, Ultrasonic Gyroscope, Accelerometer, PIR.	04	12
4.	**Introduction to Raspberry Pi platform** Choosing a right board, IoT Device, Tools, Sensing IoT Environments.	04	12
SECTION II			
Module No.	Content	Hours	Weightage in %
1.	**IoT and iBeacons** Introduction to iBeacon, Hardware & Software, Connection to Serve, Classic distributed the problem.	03	14

2.	**IoT device connecting to the cloud** Introduction to the cloud for IoT, connecting IoT device to cloud, IOT on a global network.	04	14
3.	**RFID and MQTT** Introduction to RFID, MQTT, Hardware used for IoT RFID, Building MQTT server, Data on RFID Server.	04	14
4.	**IoT Security** IOT Security, Dangers, Assigning values to Information, Security Components, Key Management, Update Management.	04	08

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to IoT and Arduino Platform	04
	The architecture of UNO R3 Board	
	Blink LED Example	
2.	Connect multiple LED and Various Patterns in LED	04
3.	Introduction of Various sensors	06
4.	Connecting motor to 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 Raspberry Pi	04
12.	Basic Python programs, access GPIO	06
13.	Small Project using Raspberry Pi and sensors.	10

Text Book(s):

Title	Author/s	Publication
Beginning Arduino (2nd Edition)	Michael McRoberts	TIA
Raspberry Pi IoT Projects	John C. Shovic	Apress

Reference Book(s):

Title	Author/s	Publication
Mastering Internet of Things: Design and create your own IoT applications using Raspberry Pi 3	Peter Waher	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 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 per each practical and the average of the entire practical will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Examination.
- Viva/Oral performance consists of 30 marks during End Semester Examination.

Course Outcome(s):

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

- understand the fundamentals of the Internet of Things.
- understand IoT architecture, hardware, and software.
- develop projects of the Internet of Things.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2060
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	
02	04	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

5.	**Drawing and Working with Animation** Working with Canvases and Paints, Working with Text, Working with Bitmaps, Working with Shapes, Working with Animation.	02	08
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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
2.	**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
3.	**Networking, Web and Multimedia APIs** Understanding Mobile Networking Fundamentals, Accessing the Internet (HTTP), Browsing the Web with WebView, Building Web Extensions using WebKit, Working with Flash, Multimedia, Still Images, Video and Audio.	03	15
4.	**Telephony APIs** Working with Telephony Utilities, Using SMS, Making and Receiving Phone Calls, notifying a user, Notifying with Status Bar, Vibrating the Phone, Blinking the Lights, Making Noise, Customizing the Notification, Designing Useful Notification.	04	10

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Create Hello World Application.	02
2.	Create login 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: ImageButton, ToggleButton, ProgressBar.	04
7.	Create an application with UI components: Spinner, DatePicker, TimePicker, SeekBar, Switch, RatingBar.	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

Text Book(s):

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

Reference Book(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and 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 per each practical and the average of the entire practical will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Examination.
- Viva/Oral performance consists of 30 marks during End Semester Examination.

Course Outcome(s):

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

- understand the differences between Android and other mobile development environments.
- design and develop useful Android applications with compelling user interfaces by using, extending, and creating your own layouts and views and using menus, data storage and other APIs.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2920
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			04	00	00	100	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- Identify, analyse and articulate projects with a comprehensive and systematic approach.
- develop creative thinking.
- perform in a dynamic team.

Guideline(s):

Sr. No	Content	Hours	Weightage in %
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.	06	10
2.	**Literature Review** Study in detail about the topic chosen.	12	10
3.	**Project Proposal** Prepare the proposal on the aspect of the selected area to work upon.	10	40
4.	**Implementation** Implementation of the proposal in any of the programming languages.	08	20
5.	**Report Writing** The report must be prepared as per suggested guidelines consisting of Preamble, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure.	04	10
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.	05	10

Course Evaluation:

Sr. No.	Evaluation criteria	Marks
1.	Selection of the topic (Within first 30 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 completion of the course, the students will be able to:

- get information about various existing and future technologies.
- learn the technology of choice and apply that knowledge in solving in real time problems.
- develop skills to work in a team in development of technical projects.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2520
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	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Fundamental concept of Algorithm Design & Analysis** Algorithm: characteristics, specifications, Writing Pseudo-Code, Analysis of an algorithm, Asymptotic Notations: Time complexity & Space complexity of an algorithm, Big 'O'& 'Ω' notations, Best, Worst and Average case analysis of an algorithm, Analysis of sequential searching algorithms and sorting methods: bubble, insertion, selection, heap sort.	06	20
2.	**Divide and Conquer Algorithmic Design Method** Divide and conquer: basic algorithm and characteristics, 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 %
1.	**Dynamic Programming Method** Dynamic Programming Method: basic algorithm and characteristics, 0/1 Knapsack Problem solving using DP method, Multistage graphs, Optimal binary search trees, Travelling salesperson problem.	06	18

2.	**Branch and Bound technique** Branch and bound: basic algorithm and characteristics, solving 4-queens, 8-queens, n-queens using branch & bound.	06	18
3.	**Hashing** The Symbol Table Abstract Data Types, Hash Tables, Hashing Functions, Hash collision Resolution Technique, Linear Probing.	03	14

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and 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 per each practical and 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 during End Semester Examination.
- Viva/Oral performance consists of 15 marks during End Semester Examination.

Course Outcome(s):

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

- analyze and design algorithms.
- understand how the worst-case time complexity of an algorithm is computed.
- understand how asymptotic notation is used to provide a rough classification of algorithms.
- design time and space efficient algorithms using different techniques.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2510
Course Name: Enterprise Resource Planning
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand the business process, project management life cycle and emerging trends of ERP.
- learn new tools to support ERP in an organization.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**ERP and Related Technologies:** Introduction, Related Technologies, Business Intelligence, E-Commerce and E-Business, Business Process Reengineering, Data Warehousing, Data Mining, OLAP, Product life Cycle management, Supply chain management, Customer relationship management, Management information system, Decision support system, Executive information system.	08	25
2.	**ERP Implementation:** Implementation Challenges, Strategies, Life Cycle, Pre-implementation Tasks, Requirements Definition, Methodologies, Package selection, Project Teams, Process Definitions, Vendors and Consultants, Data Migration, Project management, Post Implementation Activities.	07	25
Section II			
Module No.	Content	Hours	Weightage in %
1.	**ERP in Action and Business Modules** Operation and Maintenance, Performance, Maximizing the ERP System Business Modules: Finance, Manufacturing, Human	08	25

	Resources, Plant maintenance, Materials Management, Quality management, Marketing, Sales, Distribution and service.		
2.	**Introduction to ERP Tools:** Marketplace, Dynamics, SAP AG, Oracle, PeopleSoft, JD Edwards	07	25

List of Tutorial(s):

Tutorials consists of discussion and implementing modules of ERP based upon above syllabus and students need to work in groups and present their ideas. Based on participation and supporting points each student in a group will be evaluated.

Text Book(s):

Title	Author/s	Publication
ERP Demystified	Alexis Leon	Tata Mc Graw-Hill
Enterprise Resource Planning	Alexis Leon	Tata Mc Graw-Hill

Reference Book(s):

Title	Author/s	Publication
Guide to Planning ERP Application	Annetta Clewwto and Dane Franklin	Mc Graw Hill

Web Material Link(s):

- https://www.saponlinetutorials.com/what-is-erp-systems-enterprise-resource-planning/
- https://www.tutorialspoint.com/management_concepts/enterprise_resource_planning.htm

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.

Tutorial:

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

Course Outcome(s):

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

- analyze the life cycle of ERP and its related technologies.
- Identify implementation strategy used for ERP.
- understand the basic tools of ERP.
- apply different emerging technologies to implement ERP.

P P Savani University
School of Sciences

Department of Computer Application

Course Code: SSIT2530
Course Name: Digital Marketing
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand Digital Marketing as an effective marketing mix element for marketing products and services for new enterprise and startups.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Digital Marketing** - Introduction and Strategic Setup - Digital Marketing from traditional to modern era - Opportunities and Challenges - Role of Internet and its Current trends - Implications for business & society - Emergence of digital marketing as a tool - Drivers of the new marketing environment - Digital Marketing Framework & Models	07	25
2.	**Digital Marketing Mix** - Search Engine Advertising - Pay for Search Advertisements - Ad Placement, Rank - Creating and Enhancing Ad Campaigns - Evaluating Campaigns	08	25
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Display Marketing** - Display Ads – Concepts and Types	08	25

	- Buying Models (CPC, CPM, CPL, CPA) - Targeting Display Ads - Programmable Digital Marketing - Analytical Tools - YouTube marketing		
2.	**Social media metrics** - Mobile Advertising, - Forms of Mobile Marketing & Features - Mobile Campaign Development - Mobile Advertising Analytics - Google Analytics & Google AdWords - Data collection for web analytics - Multichannel attribution - Universal analytics and Tracking	07	25

List of Tutorial(s):

Tutorials consists of discussion and preparing report on various case studies based upon above syllabus and students need to work in groups and present their ideas. Based on participation and supporting points each student in a group will be evaluated.

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

- analyze different methods of digital marketing.
- understand business models on which digital marketing can have impact.
- apply knowledge of social media to make successful businesses.

THIRD YEAR B. SC (IT)

P P SAVANI UNIVERSITY														
SCHOOL OF ENGINEERING														
TEACHING & EXAMINATION SCHEME FOR THIRD YEAR B. SC. (IT) PROGRAMME														
Sem.	Course Code	Course Name	Teaching Scheme				Credit	Examination Scheme						
			Contact Hours					Theory		Practical		Tutorial		Total
			Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
5	SSIT3910	Project/Industrial Training	4			0	4	0	0	100	0	0	0	100
	SSIT3010	Software Engineering	3	0	1	4	4	40	60	0	0	50	0	150
	SSIT3021	Data Science	3	4	0	7	5	40	60	40	60	0	0	200
	SSIT3030	Open-Source Technology	0	4	0	4	2	0	0	100	0	0	0	100
	SSIT3920	Project – II	4			4	4	0	0	100	0	0	0	100
	CFLS3041	Employment Communication	2	0	0	2	2	100	0	0	0	0	0	100
	SEPD3050	Integrated Personality Development Course – II	2	0	0	2	1	100	0	0	0	0	0	100
		Elective-II	2	2	0	4	3	40	60	20	30	0	0	150
					Total	**27**	**25**							**1000**
6	SSIT3050	Online NPTEL Course	3	0	0	3	3	100	0	0	0	0	0	100
	SSIT3930	Project/Training		26		26	26	0	0	200	300	0	0	500
					Total	**29**	**29**							**600**
					Grand Total	**150**	**130**							**4750**

P P SAVANI UNIVERSITY														
SCHOOL OF SCIENCES														
TEACHING & EXAMINATION SCHEME FOR THIRD YEAR B. SC. (INFORMATION TECHNOLOGY) PROGRAMME (ELECTIVE COURSES)														
Course Code	**Course Name**	**Offered By**	**Teaching Scheme**					**Examination Scheme**						
			Contact Hours				**Credit**	**Theory**		**Practical**		**Tutorial**		**Total**
			Theory	**Practical**	**Tutorial**	**Total**		**CE**	**ESE**	**CE**	**ESE**	**CE**	**ESE**	
SSIT3510	Cyber Security	-	2	2	0	4	3	40	60	20	30	0	0	150
SSIT3520	Computers & Network Security	-	2	2	0	4	3	40	60	20	30	0	0	150
SSIT3530	Wireless Networks	-	2	2	0	4	3	40	60	20	30	0	0	150
SSIT3542	Artificial Intelligence	-	2	2	0	4	3	40	60	20	30	0	0	150
SSIT3550	Programming with .NET	-	2	2	0	4	3	40	60	20	30	0	0	150
SSIT3560	System Programming	-	2	2	0	4	3	40	60	20	30	0	0	150

P P Savani University
School of Sciences

Course Code: SSIT3910
Course Name: Project/Industrial Training
Prerequisite Course(s): --

Teaching & Examination Scheme

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Guidelines(s):

Sr. No.	Content	Hours	Weightage in %
1.	**Selection of Project Title** After selecting the Project and proposed title, get approval from the Expert Panel	10	10
2.	**Literature Review / Requirement Analysis** Study in detail about the project definition chosen	10	10
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	10	20
4.	**Implementation** Implementation of the project in any of the programming languages	20	40
5.	**Report Writing** The report must be prepared as per suggested guidelines consisting of Preamble, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure	05	10
6.	**Presentation Preparation** At the end of the semester, the student/group of students shall give a presentation of their work followed by a viva-voce examination	05	10

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 31 to 45 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

Course Outcome(s):

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

- get information about various existing and future technologies.
- learn the technology of choice and apply that knowledge in solving real life problems.
- develop skills to work in the industry.

P P Savani University
School of Sciences

Course Code: SSIT3010
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	00	01	04	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- study the pioneer of Software Development Life Cycle, Development models and Agile Software Development.
- study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- learn the process of improving the quality of software work products.
- gain the techniques and skills on how to use modern software testing tools to 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** Study of Different Models, Software Characteristics Components, Applications, Layered Technologies, Processes, Methods and Tools, Generic View of Software Engineering, Process Models- Waterfall model, Incremental, Evolutionary process models- Prototype, Spiral, and Concurrent Development Model	07	15
2.	**Requirements Engineering** Problem Recognition, Requirement Engineering tasks, Processes, Requirements Specification, Use cases, and Functional specification, requirement validation, Requirements Analysis, Modeling – different types	06	15
3.	**Structured System Design** Design Concepts, Design Model, Software Architecture, Data Design, Architectural Styles and Patterns, Architectural	05	05

	Design, Alternative architectural designs, Modeling Component level design and its modeling, Procedural Design, Object Oriented Design		
4.	**User Interface Design** Concepts of UI, Interface Design Model, Internal and External Design, Evaluation, Interaction, and Information Display Software	02	05
5.	**Planning a Software Project** Scope and Feasibility, Effort Estimation, Schedule and staffing, Quality Planning, Risk management- identification, assessment, control, project monitoring plan, Detailed Scheduling	03	10
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Quality Assurance** Quality Control, Assurance, Cost, Reviews, Software Quality Assurance, Approaches to SQA, Reliability, Quality Standards-ISO9000 and 9001	04	10
2.	**Coding and Unit Testing** Programming principles and guidelines, Programming practices, Coding standards, Incremental development of code, Management of code evaluation, Unit testing- procedural units, classes, Code Inspection, Metrics – size measure, complexity metrics, Cyclomatic Complexity, Halstead measure, Knot Count, Comparison of Different Metrics	07	15
3.	**Testing** Concepts, Psychology of testing, Levels of testing, Testing Process- test plan, test case design, Execution, Black-Box testing – Boundary value analysis – Pairwise testing- state-based testing, White-Box testing – criteria and test case generation and tool support, Metrics – Coverage analysis-reliability	07	15
4.	**Software Project Management** Management Spectrum, People –Product – Process- Project, W5HH Principle, Importance of Team Management	02	05
5.	**Case Tools and Study** Introduction to CASE Building Blocks of CASE, Integrated CASE Environment	02	05

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	To identify the role of the software in today's world across a few significant domains related to day-to-day life.	01
2.	To identify the problem related to software crisis for a given scenario.	01
3.	To identify the suitable software development model for the given scenario.	01

4.	To identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenarios.	01
5.	To identify the various elicitation techniques and their usage for the Banking case study.	01
6.	To classify the requirement into functional and non-functional requirements.	01
7.	Identify the elements in software Requirements Specification document.	01
8.	To verify the requirements against the quality attributes.	01
9.	Identify the elements and relationship by analyzing the class diagram of Shop Retail Application case study.	01
10.	Identify the design principle that is being violated in relation to the given scenario.	01
11.	To identify the usage of stubs or drivers in the context of an integration testing scenario.	01
12.	Identify the different types of performance testing.	01
13.	To identify the usage of regression testing.	01
14.	To understand usage of software metrics.	01
15.	Project Work: Understand importance of SDLC approach & various processes.	01

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.

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 10 marks.
- Internal viva consists of 10 marks.

- Practical performance/quiz/test consists of 15 marks during End Semester Exam.
- Viva/oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

- prepare SRS (Software Requirement Specification) document and SPMP (Software Project Management Plan) document.
- apply the concept of functional oriented and object-oriented approach for software design.
- recognize how to ensure the quality of software product, different quality standards, and software review techniques.
- apply various testing techniques and test plan in.

P P Savani University
School of Sciences

Course Code: SSIT3021
Course Name: Data Science
Prerequisite Course(s): SSIT1040 - Data Structures

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	04	00	05	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

2.	Applications of Data Science, Technologies for visualization, Bokeh (Python)	07	15
3.	Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods used in data science	07	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Basics of Python for Data Analysis • Why learn Python for data analysis? • Python 2.7 v/s 3.4 • 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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

- understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists;
- understand how data is collected, managed and stored for data science;
- implement data collection and management scripts using MongoDB.

P P Savani University
School of Sciences

Course Code: SSIT3030
Course Name: Open Source Technology
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand basics of Selenium.
- develop Web UI (User Interface) automation testing suit.
- develop and design testing-based tools.

Course Content:

Sr. No.	Content	Weightage In %
1.	Selenium IDE installation	25
2.	Selenium IDE features, first test case, login test, commands, creating test cases and locating strategies	25
3.	Selenium web driver and its architecture	25
4.	Selenium web driver first test case and installation, features.	25

List of Practical/Tutorial:

Sr No	**Name of Practical/Tutorial**	**Hours**
1.	Running test case on Firefox	04
2.	Running test case on chrome	04
3.	Running test case on IE and running test case on safari	04
4.	Locating strategies by ID, class name, name, tag name, tag name, link text, partial link text, CSS and XPath	04
5.	WEB driver commands: handling radio buttons, assertions, checkbox, and grid.	04
6.	Selenium with python: • Login to Facebook • Login to Facebook and check title • How to increase view count on website? • How to login on website take example of zomato? • Automate google search using selenium with python	10

Web Material Link(s):

- https://www.javatpoint.com/selenium-python
- https://www.techbeamers.com/selenium-webdriver-python-tutorial/

Course Evaluation:

Practical:

- Continuous Evaluation consists of Performance of Practical which should be evaluated out of 50 for each practical and average of the same will be converted to 50 Marks.
- Internal Viva consists of 50 Marks.

Course Outcome(s):

At the end of the course, the students will be able to

- learn the fundamentals of distributed environment.
- develop efficient distributed system with their own logic & capabilities.
- understand the security aspects in distributed environment.

P P Savani University
School of Sciences

Course Code: SSIT3920
Course Name: Project - II
Prerequisite Course(s): --

Teaching & Examination Scheme

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Guidelines(s):

Section I			
Sr. No.	Content	Hours	Weightage in %
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	06	10
2.	**Literature Review** Study in detail about the topic chosen	12	10
3.	**Project Proposal** Prepare the proposal on the aspect of the selected area to work upon	10	40
4.	**Implementation** Implementation of the proposal in any of the programming languages	08	20
5.	**Report Writing** The report must be prepared as per suggested guidelines consisting of Preamble, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure	04	10
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	05	10

Course Evaluation:

Sr. No	Name of Practical	Marks
1.	Selection of the topic (Within first 20 Days of commencement of semester)	10
2.	Initial Presentation of the topic	10
3.	An actual work carried out	10
4.	Report writing as per guidelines	10
5.	Project and report submission	10
6.	Presentation & Question-Answer session	50

Course Outcome(s):

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

- get information about various existing and future technologies.
- learn the technology of choice and apply that knowledge in solving real life problems.
- develop skills to work in a team.

P P Savani University
School of Sciences

Course Code: SSIT3050
Course Name: Online NPTEL 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	00	00	03	100	00	00	00	00	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 NPTEL course; available time to time.

Course Evaluation:

Practical:

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

Course Outcome(s):

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

- apply gained knowledge in the relevant industry.
- earn subject expertise from national expert.

P P Savani University
School of Sciences

Course Code: SSIT3930
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	
	26		26	00	00	200	300	00	00	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.

Guidelines(s):

Section I			
Sr. No.	Content	Hours	Weightage in %
1.	**Selection of Project Title** After selecting the Project and proposed title, get approval from the Expert Panel	30	10
2.	**Literature Review / Requirement Analysis** Study in detail about the project definition chosen	30	10
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	40	20
4.	**Implementation** Implementation of the project in any of the programming languages	100	40
5.	**Report Writing** The report must be prepared as per suggested guidelines consisting of Preamble, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure	50	10
6.	**Presentation Preparation** At the end of the semester, the student/group of students shall give a presentation of their work followed by a viva-voce examination.	50	10

Course Evaluation:

Sr. No	Evaluation Criteria	Marks
1.	Selection of the topic (Within first 30 Days of commencement of semester)	100
2.	Initial Presentation of the topic (Within 31 to 45 Days of commencement of semester)	100
3.	An actual work carried out. (Within 46 to 70 Days of commencement of semester)	400
4.	Report writing as per guidelines	100
5.	Presentation & Question-Answer session	300

Course Outcome(s):

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

- get information about various existing and future technologies.
- learn the technology of choice and apply that knowledge in solving real life problems.
- develop skills to work in the industry.

P P Savani University
School of Sciences

Course Code: SSIT3510
Course Name: Cyber Security
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	02	00	03	40	60	20	30	00	00	150

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 order to mitigate the security risk and estimate the impact on society and world.
- interpret and apply Indian IT laws in various legal issues.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Cyber Security** Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats: - Cyber Warfare-Cyber Crime-Cyber Terrorism-Cyber Espionage, need for a Comprehensive Cyber Security Policy, need for a Nodal Authority, Need for an International convention on Cyberspace	05	10
2.	**Cyber Security Vulnerabilities and Cyber Security Safeguards** Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards-Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management	05	20
3.	**Securing Web Application, Services and Servers** Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges	02	10

4.	**Intrusion Detection and Prevention** Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation	03	10
Section II			
Module No.	Content	Hours	Weightage In %
1.	**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
2.	**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
3.	**Cyber Forensics** Introduction to Cyber Forensics, Handling Preliminary analysis, Investigating Investigations, Controlling an Investigation, conducting disk-based Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time	05	10

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

- understand cyber-attack, types of cybercrimes, cyber laws and also how to protect them self and ultimately society from such attacks.
- apply Information Security Standards compliance during software design and development.

P P Savani University
School of Sciences

Course Code: SSIT3520
Course Name: Computers & Network Security
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand cryptography theories, algorithms and systems.
- understand necessary approaches and techniques to build protection mechanisms in order to secure computer networks.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Symmetric Cipher Model, Cryptography and Cryptanalysis, Types of Security, Security Services, Security Attacks and Security Mechanisms, Substitution and Transposition techniques.	01	05
2.	**Classical Encryption Techniques** Substitution Ciphers, Permutation/Transposition Ciphers, PlayFair and Hill Ciphers, Polyalphabetic Ciphers, OTP and Machine Ciphers.	02	05
3.	**Mathematics of Cryptography 1** Integer arithmetic, modular arithmetic.	02	05
4.	**Stream Ciphers and Block Ciphers** Stream ciphers and block ciphers, Block Cipher structure, Data Encryption standard (DES) with example, strength of DES, Design principles of block cipher, AES with structure, its transformation functions, key expansion, example and implementation.	02	10
5.	**Multiple Encryption and Triple DES** Multiple encryption and triple DES, Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback mode, Output Feedback mode, Counter mode.	02	05

6.	**Mathematics of Cryptography 2** Algebraic Structures, GF (2^n) fields.	02	05
7.	**Public Key Cryptosystems** Public Key Cryptosystems with Applications, Requirements and Cryptanalysis, RSA algorithm, its computational aspects and security, Diffie-Hillman Key Exchange algorithm, Man-in-Middle attack.	02	10
8.	**Key Management and Distribution** Key management and distribution, symmetric key distribution using symmetric and asymmetric encryptions, distribution of public keys, X.509 certificates, Public key infrastructure.	02	05
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Cryptographic Hash Functions** Cryptographic Hash Functions, their applications, Simple hash functions, its requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA).	02	05
2.	**Message Authentication Codes** Message Authentication Codes, its requirements and security, MACs based on Hash Functions, Macs based on Block Ciphers.	02	05
3.	**Digital Signature, its properties** Digital Signature, its properties, requirements and security, various digital signature schemes (Elgamal and Schnorr), NIST digital Signature algorithm.	02	05
4.	**Remote User Authentication with Symmetric and Asymmetric Encryption** Remote user authentication with symmetric and asymmetric encryption, Kerberos.	02	05
5.	**Network Security** What is Network Security? Introduction to TCP/IP protocol stack, Security at various layers of TCP/IP, Types of Network Attacks: Active Attacks and Passive Attacks.	02	05
6.	**Firewalls and Web Security** Packet filters, Application-level gateways, Encrypted tunnels, Cookies, Web security problems.	01	05
7.	**Application Layer Security** Electronic Mail Security: Distribution lists, Establishing keys, Privacy, source authentication, message integrity, non-repudiation, proof of submission, proof of delivery, message flow confidentiality, anonymity, Pretty Good Privacy (PGP).	01	05
8.	**Security at Network Layer** SSL and TLS. IPSec, AH, ESP, IKE.	01	10
10.	**Advanced Topics** Intruders, Virus, Trojans, Malware, Ransomware.	02	05

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Write a program to implement Ceaser cipher.	02
2.	Write a program to implement the Playfair cipher.	02
3.	Write a program to implement the columnar transposition cipher.	02
4.	Write a program to implement rail fence transposition cipher.	02
5.	Write a program to implement Vernam cipher.	02
6.	Write a program to implement n-gram Hill Cipher.	02
7.	Write a program to implement the Vigenere Cipher.	02
8.	Write a program that implements the Extended Euclidean Algorithm to find inverse of a given number in the Galois field.	02
9.	Write a program to implement DES Cipher.	04
10.	Write a program to implement AES Cipher.	04
11.	Write a program to implement RSA Cryptosystem.	04
12.	Demonstration of Wireshark for Packet Capturing.	02

Text Book(s):

Title	Author/s	Publication
Cryptography and Network Security: Principles and Practice,5/e	William Stallings	Prentice Hall

Reference Book(s):

Title	Author/s	Publication
Cryptography and Network Security	Behrouz A. Forouzan	McGraw-Hill Education
Network Security: Private Communications in a Public World, 2nd Edition	Charlie Kaufman, Radia Perlman and Mike Speciner	Prentice Hall
Handbook of Applied Cryptography	Alfred J. Menezes, Jonathan Katz, Paul C. van Oorschot, Scott A. Vanstone	CRC Press
Computer Security, 3/e	Dieter Gollmann	Wiley

Web Material Link(s):

- http://ggu.ac.in/download/Class-Note14/public%20key13.02.14.pdf
- https://onlinecourses.nptel.ac.in/noc19_cs28/preview

Course Evaluation:

Theory:

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

Course Outcome(s):

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

- learn the concepts related to applied cryptography, including plaintext, cipher text, symmetric cryptography, asymmetric cryptography, and digital signatures.
- learn the theory behind the security of different cryptographic algorithms.
- learn common network vulnerabilities and attacks, defense mechanisms against network attacks, and cryptographic protection mechanisms.

P P Savani University
School of Sciences

Course Code: SSIT3530
Course Name: Wireless 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	
02	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
- learn the basics of Wireless voice and data communication technologies.
- build knowledge on various Mobile Computing Algorithms.
- build skills in working with Wireless application Protocols to develop mobile content applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Mobile Computing Architecture** Types of Networks, Architecture for Mobile Computing, 3-tier Architecture, Design Considerations for Mobile Computing, Applications. **Wireless Transmission** Signals, Antennas Signal propagation, Multiplexing, Modulation, Cellular Systems. **Medium Access Control** Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA.	03	05
2.	**Wireless Networks – 1** GSM and SMS, Global Systems for Mobile Communication (GSM and Short Service Messages SMS), GSM Architecture, Protocols, Call routing in GSM, Handover, Security, Introduction to SMS, SMS Architecture, SM MT, SM MO, SMS as Information bearer, applications.	04	15
3.	**Wireless Networks – 2**	04	15

	GPRS, GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Billing and Charging in GPRS.		
4.	**Wireless Networks –3** 3G,4G, and 5G Networks, WiMAX, Third Generation Networks, Fourth Generation Networks, Vision of 5G,3G vs. 4G vs. 5G, Features and Challenges, Introduction to WiMAX.	04	15
	Section II		
Module No.	Content	Hours	Weightage in %
1.	**Mobile network layer** Mobile IP, Dynamic Host Configuration protocol, Mobile ad-hoc networks **Mobile Transport layer** Traditional TCP, classical TCP improvements, TCP over 3G/4G wireless networks	04	10
2.	**Mobile OS and Computing Environment** Smart Client Architecture, The Client: User Interface, Data Storage, Performance, Data Synchronization, Messaging. The Server: Data Synchronization, Enterprise Data Source, Messaging. Mobile Operating Systems, The Development Process,	04	15
3.	**Building Mobile Internet Applications** Thin client: Architecture, the client, Middleware, Messaging Servers, Processing a Wireless request, Wireless Applications Protocol (WAP) Overview, Wireless Languages: Markup Languages, HDML, WML, HTML, cHTML, XHTML, VoiceXML.	04	15
4.	**The architecture of future Networks, Wireless Sensor Network, IoT**	03	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Setup & Configuration of Wireless Access Point (AP)	04
2.	Implementation of Wireless Network with a number of nodes and different parameters using Simulator.	04
3.	Study of WLAN: Ad Hoc & Infrastructure Mode	04
4.	GSM modem study and SMS client-server application	04
5.	Mobile Internet and WML	04
6.	Design and Program Income Tax and Loan EMI Calculator for Mobile Phones	04
7.	Implementation of Mobile Network using Network Simulator (NS2)	06

Text Book(s):

Title	Author/s	Publication
Mobile Communications	Schiller	Pearson
Wireless Communications & Networks	William Stallings	Pearson

Reference Book(s):

Title	Author/s	Publication
Principles of Mobile Computing	UIWE Hansman, Other Merk, Martin-S-Nickious, Thomas Stohe	Springer international Edition
Mobile Computing	Ashok K. Teludkar	TMH
Mobile AdHoc Networks	Chai K.Toh	Prentice Hall
Mobile Computing	Sipra DasBit,Biplab K. Sikdar	PHI,2009

Web Material Link(s):

- http://alphace.ac.in/downloads/notes/cse/10cs831.pdf

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 15 marks and 1 hour of duration and the average 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 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 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 15 marks during End Semester Exam.
- Viva/oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

- understand the fundamentals of wireless communications.
- analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
- demonstrate basic skills for cellular networks design.
- apply knowledge of TCP/IP extensions for mobile and wireless networking.

P P Savani University
School of Sciences

Course Code: SSIT3542
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	00	03	40	60	20	30	00	00	150

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.	What is AI?: The AI Problems, The Underlying Assumption, What Is An AI Techniques, The Level Of The Model, Criteria For Success, Some General References, One Final Word.	05	10
2.	Problems, State Space Search & Heuristic Search Techniques: Defining the Problems as A State Space Search, Production Systems, Production Characteristics, Production System Characteristics, And Issues in The Design of Search Programs	05	10
3.	Knowledge Representation Issues: Representations and Mappings, Approaches to Knowledge Representation. Using Predicate Logic: Representation Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution.	05	10
4.	Representing Knowledge Using Rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning. Symbolic Reasoning Under Uncertainty: Introduction to No monotonic Reasoning, Logics for Non-monotonic Reasoning	05	10
5.	Statistical Reasoning: Probability and Bays' Theorem, Certainty Factors and Rule-Base Systems, Bayesian Networks, Dempster Shafer Theory, Fuzzy Logic.	05	10

Section II			
Module No.	Content	Hours	Weightage in %
1.	Strong Slot-and-Filler Structures: Conceptual Dependency, Scripts, CYC Weak Slot-and-Filler Structures	05	5
2.	Understanding: What is understanding? What makes it hard? As constraint satisfaction and Game Playing: Overview, And Example Domain: Overview, Minimax, Alpha-Beta Cut-off, Refinements, Iterative deepening, The Blocks World,	05	10
3.	Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Semantic Analysis, Discourse and Pragmatic Processing, Spell Checking	05	10
4.	Connectionist Models: Introduction: Hopfield Network, Learning in Neural Network, Application of Neural Networks, Recurrent Networks, Distributed Representations, Connectionist AI and Symbolic AI.	03	10
5.	Introduction to Prolog: Introduction to Prolog: Syntax and Numeric Function, Basic List Manipulation Functions in Prolog, Functions, Predicates and Conditional, Input, Output and Local Variables, Iteration and Recursion, Property Lists and Arrays, Miscellaneous Topics, LISP and Other AI Programming Languages.	07	15

List of Practical:

Sr No	Name of Practical	Hours
1.	Write a program to implement Tic-Tac-Toe game problem	02
2.	Write a program to implement BFS (for 8 puzzle problem or Water Jug problem or any AI search problem)	02
3.	Write a program to implement DFS (for 8 puzzle problem or Water Jug problem or any AI search problem)	02
4.	Write a program to implement Single Player Game (Using Heuristic Function)	02
5.	Write a program to Implement A* Algorithm.	02
6.	Write a program to solve N-Queens problem using Prolog	04
7.	Write a program to solve 8 puzzle problem using Prolog.	06
8.	Write a program to solve travelling salesman problem using Prolog	04
9.	Convert following Prolog predicates into Semantic Net cat(tom). cat(cat1). mat(mat1). sat_on(cat1,mat1). bird(bird1). caught(tom,bird1). like(X,cream) :– cat(X). mammal(X) :– cat(X). has(X,fur) :– mammal(X).	04

	animal(X) :– mammal(X). animal(X) :– bird(X). owns(john,tom). is_coloured(tom,ginger).	
10.	Write the Conceptual Dependency for following statements. (a) John gives Mary a book (b) John gave Mary the book yesterday	02

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

Course Outcome(s):

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

- learn the fundamentals of distributed environment.
- develop efficient distributed system with their own logic & capabilities.
- understand the security aspects in distributed environment.

P P Savani University
School of Sciences

Course Code: SSIT3550
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	00	03	40	60	20	30	00	00	150

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 %
1.	**Windows Forms and Controls in details** The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form	04	14

	Controls, Menus, Dialogs, Tool Tips, Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls.		
2.	**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
3.	**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 Session IDs, Application State Using the DataList and Repeater Controls, Overview of List-Bound Controls, Creating a Repeater Control and DataList Control.	07	24

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Course Outcome(s):

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

- use .NET framework architecture, various tools, and validation techniques, use of different templates available in Visual Studio, implementation and testing strategies in real-time applications.
- understand the development and deployment cycles of enterprise applications.

P P Savani University
School of Sciences

Course Code: SSIT3560
Course Name: System 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	
02	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- study the architecture of a hypothetical machine, its assembly language, macro language.
- understand the structure and design of assemblers, linkers and loaders.
- understand the concepts and theory behind the implementation of high-level programming languages.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Hierarchy of computer language, Physical address space and Logical address space, Life Cycle of a source program, Types of Language Processors, Data Structure for Language Processing	03	10
2.	**Assemblers** Elements of Assembly Language Programming, Types of Assembly Statements, Types of Assemblers, Advanced Assembler Directives, Data Structure in One-pass assembler and Two-pass assembler, Intermediate code for imperative statements and its type, Error reporting in assembler	06	20
3.	**Macro and Macro Processors** Introduction, Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design of a Macro Pre-processor, Design of a Macro Assembler, Design Issues of Macro Processors, Two-Pass Macro Processors, One-Pass Macro Processors	06	20

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Linkers and Loaders** Relocation and Linking Concepts, Program Relocation, Design of Linkers, Scheme for Relocation, Scheme for Linking, Self-Relocating programs, Linking of Overlay Structure Programs, Absolute Loader, Relocating Loader	06	20
2.	**Scanning and Parsing** Programming Language Grammars, Classification of Grammars, Ambiguity in grammar specification, Top Down Parser, LL (1) Parser, Bottom Up Parser and Operator Precedence Parser	06	15
3.	**Compilers** Causes of Large Semantic Gap, Binding and Binding Times, Compilation of Expressions, Code Optimization	03	15

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Implement Lexical Analyzer in C Language.	06
2.	Write a program to extract single line and multiline comment from an input program.	04
3.	Write a program to check if valid variable name is valid.	02
4.	Write a program to demonstrate effective use of STRTOK function in c.	02
5.	Write a program to accept following regular expression • ab*a* • xy*yx • (a/b)*ab(a/b)	04
6.	Write a program to implement target code of an assembler	04
7.	Write a program to generate SYMTAB, LITTAB, TII and POOLTAB for a given assembly code	06
8.	Write a program to demonstrate Macro call and macro expansion.	02

Text Book(s):

Title	Author/s	Publication
System Programming	D M Dhamdhere	McGraw Hill Publication

Reference Book(s):

Title	Author/s	Publication
System Programming	Srimanta Pal	OXFORD Publication
System Programming and Compiler Construction	R.K. Maurya & A. Godbole	

Web Material Link(s):

- www.cs.jhu.edu/~scott/pl/lectures/parsing.html
- www.en.wikipedia.org/wiki/System_programming

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 60 Marks.

Practical:

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

Course Outcome(s):

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

- understand the execution process of HLL programs.
- understand the working of scanners and parsers.
- understand the basic design of various system software.
- implement various system software.