Syllabus Book

BCA
(Bachelor of Computer Application)
(Offered under School of Engineering)

P P Savani University

Effective From: 2022-23

Authored by: P P Savani University

CONTENT

FIRST YEAR BCA

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR BCA (BACHELOR OF COMPUTER APPLICATION) PROGRAMME AY:2022-23

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
1	SESH1040	Mathematics for Computer Applications	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SECA1010	Introduction to Computer Programming	SECA	3	4	0	7	5	40	60	40	60	0	0	200
	SECA1020	Web Application Design & Development - I	SECA	1	4	0	5	3	0	0	100	0	0	0	100
	SECA1030	Introduction to Computer Organization	SECA	3	0	2	5	5	40	60	0	0	50	0	150
	CFLS1030	Functional English - I	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
		Total					**24**	**20**							**700**
2	SESH2060	Statistics	SECA	3	2	0	5	4	40	60	20	30	0	0	150
	SECA1041	Data Structures	SECA	3	2	0	5	4	40	60	20	30	0	0	150
	SECA1050	Database Management System	SECA	3	4	0	7	5	40	60	40	60	0	0	200
	SECA1061	Object Oriented Programming with C++	SECA	3	4	0	7	5	40	60	40	60	0	0	200
	CFLS1040	Functional English - II	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
		Total					**26**	**20**							**800**

P P Savani University
School of Engineering

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.	**Elementary Combinatorics** Introduction, Basic Counting Principles, Permutation and Combination, Mathematical Induction.	06	14

Section II			
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	16
2.	**Determinants** Formation of Determinants, Minors and Co factors of the Elements of a Determinant, Properties of Determinants, Application of Determinants in Computer Science, Cramer's Rule.	08	17
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, Hyper bola and Ellipse.	09	19

List of Tutorials:

Sr. No	Name of Practical	Hours
1.	Number System-1	02
2.	Number System-2	04
3.	Mathematical Logic	04
4.	Elementary Combinatorics	04
5.	Matrix Algebra-1	02
6.	Matrix Algebra-2	04
7.	Determinants-1	02
8.	Determinants-2	04
9.	AnalyticalGeometry-1	02
10.	AnalyticalGeometry-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
Analytical Geometry: 2D and 3D	P R Vittal	Pearson
Introduction to Computer Science	ITL ESL	Pearson

Web material link:

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

After 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 Engineering
Department of Computer Application

Course Code: SECA1010
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.	08	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 statements, The turnary (? :) Operator Looping: The while statement, The break statement & The Do. While loop, The FOR loop, Jump within loops - Programs.	07	20
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.	07	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.	08	15

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	ReemaThareja	Oxford Higher Education

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the average of the entire practical will be converted to 20 marks.
- Internal viva consists of20 marks.
- Practical performance/quiz/test consists of30 marks.
- External viva consists of30 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 Engineering
Department of Computer Application

Course Code: SECA1020
Course Name: Web Application Design & Development - I
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
01	04	00	3	00	00	100	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	02	10
2.	**HTML** HTML Basics, HTML Attributes, HTML Headings, HTML Paragraphs, HTML Styles, HTML Text Formatting, HTML Links, HTML Images	03	20
3.	**CSS** CSS Syntax, CSS Colors, CSS Background, CSS Border, CSS Margin, CSS Box Model, CSS Text, CSS Fonts.	03	20
Section II			
Module No.	Content	Hours	Weightage in %
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.	05	30
2.	**Bootstrap CSS** Introduction to Bootstrap CSS, Content Delivery Network, Bootstrap classes.	02	20

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 PSavani University information.	04
7.	Write JavaScript program to show the implementation of JavaScript inside head, body, external file, folder, URL.	02
8.	Write a program to perform arithmetic operations in JavaScript.	02
9.	Write a program to concatenate two Strings in JavaScript.	02
10.	Write a program to show the use of functions in JavaScript.	02
11.	Write a JavaScript function to check whether a string is blank or not.	04
12.	Write a program to show the use of math functions in JavaScript.	02
13.	Write a program to show the use of random function in JavaScript.	02
14.	Write a program to implement arrays in JavaScript.	02
15.	Write a program to implement CSS Colors, CSS Background, CSS Border and CSS Margin.	04
16.	Write a program to show the use of CSS Box Model.	04
17.	Write a program to implement CSS Text colors and size.	02
18.	Write a program to implement CSS Fonts styles.	02
19.	Write a program to implement Bootstrap classes.	02
20.	Create a website as a mini project in this subject.	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	RiwantoMegosinarso	Kindle Edition

Web Material Link(s):

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

Course Evaluation:

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 of20 marks.
- Practical performance/quiz/test consists of30 marks.
- External viva consists of30 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 Engineering

Department of Computer Application

Course Code: SECA1030
Course Name: Introduction to Computer Organization
Prerequisite Course (s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	2	5	40	60	0	0	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

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

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Computer Data Representation** Data Representation: decimal, binary, octal and hexadecimal numbers, conversion from one number system to another, fixed point representation, signed magnitude, 1's complement and 2's complement representation, addition and subtraction of binary numbers using different representation.	08	20
2.	**Computer Architecture & Register-Transfer and Micro-operations** Overview of computers and basics of Digital Electronics-Flip Flops, Registers, Shift registers, Register - Transfer-Language, Register Transfer, Bus Transfer and Memory Transfer, Arithmetic Micro-Operations Addition, Subtraction, Complements, Negation, Increment and Decrement, Logic micro operations, Shift Micro operation.	08	15
3.	**Basic Computer Organization** Instruction codes, Computer registers, Computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt	07	15
Section II			
1.	**Computer Arithmetic** Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point arithmetic operations	06	18

2.	**Memory Organization** Memory Hierarchy, Associative Memory, Cache Memory, Virtual Memory	06	12
3.	**Input-Output Organization** Input-Output Interface, Asynchronous Data Transfer, Modes of Data Transfer, DMA Transfer	06	10
4.	**Microprocessor and Parallel Processing** Block diagram of 8086, Registers and applications of microprocessor, Parallel Processing – Flynn's classification, Pipelining.	04	10

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Computer Data Representation-1	01
2.	Computer Data Representation-2.	01
3.	Register Transfer Micro-operations-1	01
4.	Basic Computer Organization-1.	01
5.	Basic Computer Organization-2.	01
6.	Computer Arithmetic-1	01
7.	Computer Arithmetic-2	01
8.	Computer Arithmetic-3	01
9.	Computer Arithmetic-4	01
10.	Memory Organization-1	01
11.	Memory Organization-2	01
12.	Input-Output Organization-1	01
13.	Input-Output Organization-2	01
14.	Microprocessor and Parallel Processing-1	01
15.	Microprocessor and Parallel Processing-2	01

Reference Book(s):

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

Web material link:

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

- identify various components of computer and their interconnection.
- identify basic components and design of the CPU: the ALU and control unit.
- compare and select various Memory devices as per requirement

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH2060
Course Name: Statistics
Prerequisite Course(s):

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	05	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Data & Descriptive Statistics** Elements, Variables, and Observations, Scales of Measurement , Categorical and Quantitative Data, Cross-Sectional and Time Series Data, Summarizing Categorial Data and Quantitative Data, Frequency Distribution, Relative Frequency and Percentage Distributions, Bar Charts and Pie Charts, Dot Plot, Histogram, Cumulative Distributions, Ogive, Measures of Location: Mean, Median, Mode, Percentiles and Quartiles, Measures of Variability: Range, Interquartile Range, Variance, Standard Deviation, Coefficient of Variation.	10	25
2.	**Exploratory Data Analysis** Distribution Shape, z −Scores, Chebyshev's Theorem, Empirical Rule, Outliners, Five Number Summary, Box Plot.	07	15
3.	**Correlation Analysis** Type and properties of Correlation, Karl-Pearson's coefficient.	05	10
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Probability** Experiments, Counting Rules, Assigning Probabilities, Events and their Probabilities, Relationships of Probabilities, Conditional Probability, Bayes' Theorem	6	10
2.	**Discrete and Continuous Probability Distribution** Random Variables, Discrete Probability Distributions, Expected Values		

	and variance, Binomial Probability Distribution, Poisson Probability Distribution, Uniform Probability Distribution, Normal Probability Distribution.	10	25
3.	**Testing of Hypothesis** Introduction, Sampling, Tests of Significance, Null Hypothesis, Alternative Hypothesis, Type 1 and Type 2 errors, Level of Significance, Chi-square test, Student's t-test, Seducer's F-test.	7	15

List of Practical(s):

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

Text Book(s):

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

Reference Book(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcomes(s):

After completion of this course, student will be able to

- Understand Introduction to Data & Descriptive Statistics in real life usage.
- Calculate Mean, Median and Mode in real life data.
- Box Plot, which data are appropriate.
- Learn how to use probability in real world related problem.
- Understand which methods are appropriate for different kind of data.
- Use Hypothesis in different manner, solve the problem in better way.

P PSavani University
School of Engineering

Department of Computer Application

Course Code: SECA1041
Course Name: Data Structures
Prerequisite Course(s): -- Introduction to Computer Programming (SECA1010)

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

- 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.	**Pointers and File Management** Basics of Pointers, a Chain of Pointers, Pointer and Array, Pointer to an Array, an Array of Pointers, Pointers and Functions, Dynamic Memory Allocation. Introduction to file Management and its Functions.	06	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.	08	20
2.	**Linked List-II and Applications of Linked List** Linked implementation of Stack, Linked implementation of Queue, Applications of Linked List.	08	20
3.	**Searching and Sorting** Linear Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Radix sort.	06	10

List of Practical:

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

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 of10 marks.
- Practical performance/quiz/test consists of15 marks.
- External viva consists of15 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 PSavani University
School of Engineering

Department of Computer Application

Course Code: SECA1050
Course Name: Database Management System
Prerequisite Course(s):

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	04	00	5	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.	**DBMS Concepts** Components of Data Base Management System, Query Language: DDL, DML, TCL, Database Users: DBA, Programmer, Other Users, Data Independence: Logical & Physical Functional, Types of Keys & Data Integrity, Keys: Super Key, Candidate Key, Primary Key, Alternate Key, Foreign Key, Constraints, Domain Integrity, Referential Integrity, and Entity Integrity.	10	20
4.	**Built-in functions & Transaction Control** IN operator, Aggregate functions, Built-in functions: numeric, date, string functions, set operations, Sub queries, and correlated sub-queries: Join, Exist, Any, All, view and its types. Transaction Control Commands- Commit, Rollback, Save point.	05	10

Section II			
Module No.	Content	Hours	Weightage in %
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.	**Normalization** Need of Normalization (Consequences of Bad Design-Insert, Update & Delete Anomalies), Normalization, First Normal Form, Second Normal Form, Third Normal Form, BCNF.	10	20
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.	04	10

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.	04
15.	Implement queries based on group by and having clause.	02
16.	Execution of queries based on natural and inner Joins.	02
17.	Implement SQL queries based on outer join and self-join.	02
18.	Write SQL queries based on group function and join.	04
19.	Introduction to sub-queries and demonstration of their usage.	02
20.	Write SQL queries based on concept of single row sub-queries.	02
21.	Write SQL queries based on concept of multiple row sub-queries.	02
22.	Write SQL scripts to generate desired reports using group by, join and sub-queries.	02
23.	Write SQL script to solve the questions based on all SQL concepts.	02
24.	Submission of DBMS Mini Project Design	04

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 Engineering

Department of Computer Application

Course Code: SECA1061
Course Name: Object Oriented Programming with C++
Prerequisite Course(s): Introduction to Computer Programming (SECA1010)

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	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

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

Course Content:

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

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

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to C++ basic input/output functions, library files.	04
2.	Implementation of C++ programs with classes and objects.	04
3.	Implement C++ program to demonstrate use of data types, tokens and constants.	04
4.	Implementation of C++ programs to demonstrate dynamic initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator.	04
5.	Implementation of C++ programs to demonstrate use of member referencing, operators – Memory Management Operators – manipulators.	04
6.	Implementation of C++ programs for call by reference and return by reference	04
7.	Implement of C++ programs for use of inline function	04
8.	Implementation of C++ programs to demonstrate use of function overloading.	04
9.	Implementation of C++ programs to demonstrate use of virtual function.	04
10.	Implementation of C++ programs to demonstrate static data members, friend	04

	function.	
11.	Implementation of C++ programs to demonstrate constructors and destructors.	04
12.	Implementation of C++ programs to use arrays and string.	06
13.	Implementation of C++ programs for type conversions.	04
14.	Implementation of file handling operations.	06

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

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- Internal viva consists of20 marks.
- Practical performance/quiz/test consists of30 marks.
- External viva consists of30 marks.

Course Outcome(s):

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

- learn the basic concepts of the Object-Oriented Programming Paradigm.
- acquire Knowledge on Functions in C++ and the different types of Constructors in C++.
- gain Knowledge on Operator Overloading.
- learn the different types of Inheritance.
- understand the Stream Classes and Files.