SCHOOL OF ENGINEERING

B. Sc. (INFORMATION TECHNOLOGY)

WITH HONORS

SYLLABUS BOOK

AY 2025-26

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

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

Graduates will demonstrate ability to:

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

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

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

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

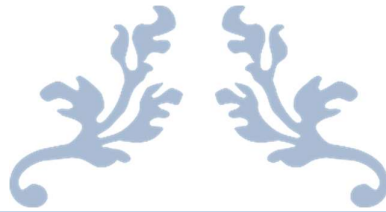| CO-PO Mapping Guidelines		
Mapping Level	% age Mapping	Indicator
0 / -	0	No Mapping
1	0-33	Low Level (Slightly Mapped)
2	33-66	Medium Level (Moderately Mapped)
3	>66	High Level (Strongly Mapped)

Syllabus Book

B. Sc. (IT) with Honors

P P Savani University
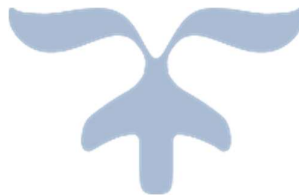School of Engineering

Effective From: 2025-26
Authored by: P P Savani University

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FIRST YEAR B. SC. (IT)

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING
INSTITUTE OF COMPUTER SCIENCE AND APPLICATION

TEACHING & EXAMINATION SCHEME FOR B.Sc.IT PROGRAMME with Honors (AY: 2025-26)

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	ICSH1010	Mathematics for Computer Applications	SH	03	-	02	05	05	40	60	-	-	100	00	200
	ICCA1010	Basics of Web Designing	CA	03	04	-	07	05	40	60	40	60	-	-	200
	ICCS1010	Introduction to Computer Organization	CS	03	-	02	05	05	40	60	-	-	100	00	200
	ICIT1010	Introduction to Computer Programming	IT	03	04	-	07	05	40	60	40	60	-	-	200
	CFLS2110	Elementary Communicative English-I	CFLS	03	-	-	03	03	100	00	-	-	-	-	100
						Total	27	23							900
2	ICSH1020	Statistics	SH	03	-	02	05	05	40	60	-	-	100	00	200
	ICCA1021	Advanced Web Designing	CA	03	04	-	07	05	40	60	40	60	-	-	200
	ICIT1020	Digital Marketing	IT	03	04	-	07	05	40	60	40	60	-	-	200
	ICIT1031	Object Oriented Programming with C++	IT	03	04	-	07	05	40	60	40	60	-	-	200
	CFLS2120	Elementary Communicative English-II	CFLS	02	-	-	02	02	100	00	-	-	-	-	100
						Total	28	22							900

Course Code: ICSH1010
Course Name: Mathematics for Computer Applications
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	-	02	05	40	60	-	-	100	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help the learners to
  ● provide foundation of data representation, logical implementation of data.
  ● educate mathematical concepts to recognize their applications in computer domain.
  ● demonstrate a basic understanding of a function, its inverse, composition, and notation.
  ● model and analyze computational processes using analytic and combinatorial methods.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Number System:** Introduction to Number System, Base, Types of Number Systems, Conversion Between Number Bases, Arithmetic Operations - Addition, Subtraction, Multiplication and Division for Binary, Octal, Hexadecimal Systems, Signed Unsigned Numbers, Binary Coding - BCD, ASCII, EBCDIC, Floating Point Representation of Numbers and Arithmetic Operation with Normalized Floating-Point Numbers.	08	18
2.	**Mathematical Logic:** Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers.	07	16
3.	**Elementary Combinatorics:** Introduction, Basic Counting Principles, Permutation and Combination, Mathematical Induction.	07	16
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Matrix Algebra:** Introduction, Types of Matrices, Operations of Matrices, Adjoint Matrices, Solution of System of Equations by Matrix Inversion Method, Applications of Matrix.	07	16
5.	**Determinants:** Formation of Determinants, Minors and Cofactors of	08	17

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

List of Tutorials:

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

Text Book (s):

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

Reference Book(s):

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

Web material link:
- https://onlinecourses.swayam2.ac.in/nou25_cm04/preview
- https://onlinecourses.swayam2.ac.in/nou25_cs01/preview?
- https://onlinecourses.nptel.ac.in/noc25_cs26/preview

Course Evaluation:
Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 hour of duration, which will be

converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

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

ICSH1010	MATHEMATICS FOR COMPUTER APPLICATIONS
CO 1	Convert decimal to binary, octal, hexadecimal for data representation and calculate arithmetic operations.
CO 2	Compute permutations and combinations on a given set of data.
CO 3	Evaluate the solution of system if linear equations through elimination method.
CO 4	Discuss the equation of straight line in different forms and related properties.

Mapping of CO with PO

ICSH1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	1								
CO 2	2	2	1	1								
CO 3	2	2	1	1								
CO 4	2	2	1	1								

Mapping of CO with PSO

ICSH1010	PSO1	PSO2	PSO3
CO 1	1	1	
CO 2	1	1	
CO 3	1	1	
CO 4	1	1	

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

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

Module No	Content	RBT Level
1	Number System	1,2,3,5
2	Mathematical Logic	1,2,4,6
3	Elementary Combinatorics	1,2,3,5
4	Matrix Algebra	1,2,3,5
5	Determinants	1,2,3,5
6	Analytical Geometry	1,2,3,5

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

Department of Computer Application

Course Code: ICCA1010
Course Name: Basics of Web Designing
Prerequisite Course(s): -

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to explore the concepts of web designing and develop user interface using markup language, applying styles and usage of scripting language.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basics of User Interface** User Interface: Importance and Benefits, Designing Principles, Design Commandments, Human Interaction with Computers, User Characteristics: Knowledge & Experience, Psychological and Physical, Design Considerations: Human and Technical	08	10
2.	**The Web and Markup Language** Basic Terminologies: Web, Web Browser, Web Server, Web Space, Intranet, Internet, Domain Name, URL, IP Address, Website and other applications, Planning Website: Types of Sites, Lifespan of Site, An Overview of Web Technologies, Markup Language Elements: Root, Metadata, Heading, Paragraph, Lines, Formatting, Form, Listing, Linking, Table, Markup Language Character Entities	07	20
3.	**Advanced Markup Language** Form Attributes, Semantic Elements, Graphics Elements, Multimedia Elements, Advance Input Element's Attributes, Types of Input Element	09	20
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Applying Styles** Syntax and Structures of Applying Styles, Styling Selectors: Element, Class, ID, Pseudo and Universal, Applying Styles using Inline, Internal and External, Styling Properties: Font, Display,	08	10

	Box, Background and Border		
5.	**Scripting Language** An Overview of Server-side and Client-side Scripting Languages, Embedding Scripting Language into Web Page, Variables and Data types, Conditional and Looping Statements, Array: Declaration, Initialization and Operations, User-defined Functions: Creation, Calling and Return a Value	06	20
6.	**Scripting Language Libraries** Incorporating Scripting Language Library into webpage, Scripting Methods: Retrieving Attributes of Markup Language Elements, Traversing Markup Language Elements, Handling Mouse and Keyboard Events	07	20
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Implement HTML Attributes, HTML Headings and HTML Paragraphs.	6
2.	Implement HTML Styles and HTML Text Formatting.	4
3.	Implement code to add Links in HTML.	4
4.	Implement code to add Images in HTML.	4
5.	Implement code to create different types of frame using HTML.	8
6.	Create a static web page using HTML to display P PSavani University information.	6
7.	Style a webpage using colors, borders, and padding.	6
8.	Build a layout with media queries and Flexbox.	8
9.	Add a JavaScript-based interactive form.	6
10.	Develop a responsive webpage using Bootstrap.	8
	TOTAL	**60**

Text Book (s):

Title	Author/s	Publication
The Essentials Guide to User Interface Design	Wilbert O. Galitz	Wiley
HTML 5 Black Book: Covers CSS3, Javasvript, XML, XHTML, AJAX, PHP and jQuery.	DT Editorial Services	Dreamtech Press

Reference Book (s):

Title	Author/s	Publication
Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP	Ivan Bayross,	Wiley
JavaScript and CSS Development using jQuery	Rechard Y.	Wrox [RY]
Beginning HTML5 and CSS3	Richard Clark, Oli S.	Apress
HTML5- the missing manual	Matthew MacDonald	O'REILLY

Web Material Link(s):
https://www.codecademy.com/catalog/subject/web-development

Course Evaluation:

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

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

Course Outcome(s):

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

ICCA1010	BASICS OF WEB DESIGNING
CO 1	Summarize the necessity of user interface and applying designing principles.
CO 2	Construct and enhance user interface by using markup language features.
CO 3	Select and apply styling features to user interface.
CO 4	Analyse and apply effects using scripting language.
CO 5	Analyse and implement events using scripting language's library.

Mapping of CO with PO

ICCA1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2			2				2		2
CO 2	3	3	3		2					2		2
CO 3	3	3	3		2					2		2
CO 4	3	3	2	3	2							2
CO 5	3	3	2	3	2							2

Mapping of CO with PSO

ICCA1010	PSO1	PSO2	PSO3
CO 1	1	2	
CO 2	1		
CO 3	1		3
CO 4	1		3
CO 5	1		3

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

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

Module No	Content	RBT Level
1	Basics of User Interface	1,2
2	The Web and Markup Language	2,3
3	Advanced Markup Language	3,4
4	Applying Styles	3,4,6
5	Scripting Language	3,4,5
6	Scripting Language Libraries	4,5,6

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

Course Code: ICCS1010
Course Name: Introduction to Computer Organization
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	-	02	05	40	60	-	-	100	00	200

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.	**Overview of Computer Systems** Definition, components, and classifications (desktop, server, embedded systems). Difference between Computer Organization and Computer Architecture. Basic functional units: Input unit, Output unit, Memory unit, Arithmetic and Logic Unit (ALU), Control Unit (CU). Instruction execution cycle: Fetch, decode, execute.	05	15
2.	**Basic Computer Organization** Instruction Codes and Computer Registers; Instruction Cycle and Timing; Input-Output Basics and Interrupt Handling.	04	7
3.	**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 and 2's Complement Representation; Addition, Subtraction, and Basic Logical Operations.	06	15
4.	**Boolean Algebra and Logic Gates** Basics of Boolean algebra: Boolean operations (AND, OR, NOT, NAND, NOR, XOR, XNOR). Laws of Boolean algebra. De Morgan's theorem. Simplification of Boolean expressions using Karnaugh Maps (up	06	15

Module No.	Content	Hours	Weightage in %
	to 4 variables). Digital logic gates and circuits: Truth tables. Combinational circuits. Encoder,Decoder -design & implementation.		

Section II			
Module No.	Content	Hours	Weightage in %
5.	**Processor and Control Unit** Introduction to microprocessors: Basic components of a processor (Registers, ALU, CU). Clock speed, instruction set, and processing modes. Control Unit (CU): Hardwired control. Microprogrammed control. Basics of RISC and CISC architectures.	06	12
6.	**Memory Organization** Types of memory: Primary memory: RAM (Static and Dynamic), ROM (PROM, EPROM, EEPROM). Secondary memory: Hard drives, SSDs. Cache memory: Levels (L1, L2, L3). Virtual memory and paging. Memory hierarchy: Characteristics and organization. Concept of memory access time and performance.	07	12
7.	**Input/Output Systems** Basics of input/output operations. I/O devices: Keyboard, mouse, printers, scanners, etc. I/O data transfer techniques: Programmed I/O. Interrupt-driven I/O. Direct Memory Access (DMA).	05	12
8.	**Basics of Storage and Peripherals** storage devices: Magnetic, optical, and solid-state. RAID (Redundant Array of Independent Disks). Peripheral devices: Monitors, projectors, external storage devices.	06	12
	TOTAL	45	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Draw and explain fetch-decode-execute cycles for simple instructions.	02
2.	Practice decimal to binary, octal, and hexadecimal conversions.	04
3.	Perform addition and subtraction using 1's and 2's complement.	04
4.	Convert and represent floating-point numbers.	02
5.	Demonstrate data transfer techniques (Programmed I/O, Interrupt-driven I/O, DMA) with examples.	02
6.	Basic AND, OR, NOT, XOR operations and create truth tables & Implement D, T, and Karnaugh Maps.	02
7.	Explain how the clock speed affects the performance of a microprocessor. How does a processor's instruction set influence its operation	02
8.	Describe the difference between single-cycle and multi-cycle processing modes. Which one is more efficient and why?	02
9.	Illustrate how data is stored and accessed in cache memory.	02
10.	Demonstrate virtual memory concepts and perform simple paging exercises.	02
11.	Compare Programmed I/O, Interrupt-driven I/O, and Direct Memory Access	02

		(DMA) in terms of speed, efficiency, and application suitability.	
12.		Describe the operation of optical storage devices such as CDs, DVDs, and Blu-ray. How do they differ from magnetic storage in terms of data reading and writing	02
13.		describe the concept of RAID and list different RAID levels (RAID 0, RAID 1, RAID 5, etc.). How do these levels enhance performance and data redundancy	02
		TOTAL	**30**

Text Book (s):

Title	Author/s	Publication
Computer System Architecture	M. Morris Mano	Pearson

Reference Book (s):

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

Web Material Link(s):
- https://nptel.ac.in/courses/106105163
- EE282 Computer Systems Architecture, Spring 2024
- Intel® Product Specifications

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 50 marks.
- Viva/ Oral performance consists of 50 marks.

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

ICCS1010	INTRODUCTION TO COMPUTER ORGANIZATION
CO 1	Understanding Computer Systems and Classifications
CO 2	Demonstrate the conversion between different number systems and perform data representation using fixed-point and complement methods.
CO 3	Understand memory types, hierarchy, and concepts like virtual memory and paging.
CO 4	Learn the operation of I/O devices and the various data transfer techniques
CO 5	Understand different storage devices and peripherals and their role

Mapping of CO with PO

ICCS1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2										

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

Mapping of CO with PSO

ICCS1010	PSO1	PSO2	PSO3
CO 1	2	3	
CO 2			
CO 3			2
CO 4	3	1	
CO 5	1	2	2

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

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

Module No	Content	RBT Level
1	Overview of Computer Systems	1,2
2	Basic Computer Organization	2,3,4
3	Computer Data Representation	1,2
4	Boolean Algebra and Logic Gates	1,2,5
5	Processor and Control Unit	1,2
6	Memory Organization	2,3
7	Input/Output Systems	1,2,4,6
8	Basics of Storage and Peripherals	2,3,5

Department of Information Technology

Course Code: ICIT1010
Course Name: Introduction to Computer Programming
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	04	-	05	40	60	40	60	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.	**Fundamentals of Computer Programming** Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming	03	05
2.	**Fundamentals of C** 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.	04	10
3.	**Control structure in C** Simple statements, Decision making statements, Looping statements, Nesting of control structures, break and continue, goto statement.	06	15
4.	**Array & String, Function** Concepts of array, one- and two-dimensional arrays, declaration and initialization of arrays, string, string storage, Built-instring functions, Concepts of user defined functions, prototypes, definition of function, parameters, parameter passing, calling function, recursive function,Macros, Pre-processing.	07	15

Section II				

Module No.	Content	Hours	Weightage in %
5.	**Recursion** Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort	04	15
6.	**Pointers** Basics of pointers, pointer to pointer, pointer and array, pointer to array, array to pointer, function returning pointer.	06	15
7.	**Structure & Union** Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers,Accessing Structure members, Union.	08	15
8.	**Dynamic memory allocation & File management** Introduction to Dynamic memory allocation, malloc, calloc, Introduction to file management and its functions.	07	10
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Write an algorithm and draw a flowchart to find the largest number among three user inputs.	2
2.	Write an algorithm and draw a flowchart to compute the factorial of a number n.	2
3.	Write a program that performs basic arithmetic operations (addition, subtraction, multiplication, and division)and demonstrates the use of different data types.	4
4.	Create a program that uses if, else, and switch statements to implement a simple menu-driven application. Useloops (for, while, and do-while) to repeat tasks	6
5.	Develop a program that calculates the factorial of a number using both iterative and recursive functions	4
6.	Write a program to perform various operations on arrays (e.g., sorting, searching) and strings (e.g.,concatenation, comparison).	6
7.	Implement a program that uses pointers to create and manipulate dynamic arrays, demonstrating the use of malloc, calloc, realloc, and free.	4
8.	Design a student record system using structures that store and display information such as name, roll number,and grades.	6
9.	Write a program to read from and write to files, such as creating a simple text editor that performs basic file operations.	4

10.	Implement a singly linked list with operations like insertion, deletion, and traversal.	6
11.	Develop programs to simulate stack operations (push, pop, peek).queue operations (enqueue, dequeue)using arrays and linked lists.	4
12.	Develop a program to define queue operations (enqueue, dequeue)using arrays and linked lists.	4
13.	Write a program that takes a number (1–7) as input and prints the corresponding day of the week.	4
14.	Provide students with a program containing intentional errors and inefficiencies. Have them use debugging tools (like gdb) to find and fix the errors and optimize the code for better performance.	4
	TOTAL	**60**

Text Book (s):

Title	Author/s	Publication
Programming in ANSI C	E. Balagurusamy	Tata McGraw Hill

Reference Book (s):

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

Web Material Link(s):
● https://www.javatpoint.com/c-programming-language-tutorial
● https://nptel.ac.in/courses/106105085/4
● https://fresh2refresh.com/c-programming/

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

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

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

ICIT1010	INTRODUCTION TO COMPUTER PROGRAMMING
CO 1	Understand the basic concepts of programming.
CO 2	Apply fundamental programming constructs like loops, conditionals, and functions to solve problems.
CO 3	Design and develop structured programs using modular programming techniques.
CO 4	Implement algorithms for problem-solving in a high-level programming language.
CO 5	Debug and test programs to ensure correctness and efficiency.

Mapping of CO with PO

ICIT1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1		2							
CO 2	3	3	2	1	2							
CO 3	3	3	3	2	2				1			
CO 4	3	3	3	3	3				2			
CO 5	3	2	2	2	3					2		

Mapping of CO with PSO

ICIT1010	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	3	3	2
CO 3	3	3	3
CO 4	3	3	3
CO 5	2	3	3

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

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

Module No	Content	RBT Level
1	Fundamentals of Computer Programming	1,2
2	Fundamentals of C	1,2
3	Control structure in C	1,2,3,6
4	Array & String, Function	1,2
5	Recursion	1,2,3,4
6	Pointers	2,3,6
7	Structure & Union	2,3,5
8	Dynamic memory allocation & File management	2,3,4,6

Course Code: ICSH1020
Course Name: Statistics
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	-	02	05	40	60	-	-	100	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

	Probabilities, Relationships of Probabilities, Conditional Probability, Bayes' Theorem	06	10
5.	**Discrete and Continuous Probability Distribution** Random Variables, Discrete Probability Distributions, Expected Values and variance, Binomial Probability Distribution, Poisson Probability Distribution, Uniform Probability Distribution, Normal Probability Distribution.	10	25
6.	**Testing of Hypothesis** Introduction, Sampling, Tests of Significance, Null Hypothesis, Alternative Hypothesis, Type 1 and Type 2 errors, Level of Significance, Chi-square test, Student's t-test, Seducer's F-test.	07	15
	TOTAL	**45**	**100**

List of Tutorial:

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

Text Book(s):

Title	Author/s	Publication
Basic Statistics	B L AGRAWAL	New Age International

Reference Book(s):

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

Web Material Link(s):
- https://onlinecourses.nptel.ac.in/noc25_ma04/preview?
- https://onlinecourses.swayam2.ac.in/nou24_cm19/preview?

Course Evaluation:
Theory:

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

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

Course Outcome(s):

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

ICSH1020	STATISTICS
CO 1	Elaborate analysis of categorial data and quantitative data.
CO 2	Examine the box plot for real data and able to find the outliers.
CO 3	Adapt the knowledge of various probability distribution and their applications in mathematical models, sport strategies and insurance.
CO 4	Adapt the knowledge of various probability distribution and their applications in insurance, banking and sentiment analysis.

Mapping of CO with PO

ICSH1020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	1	2								1
CO 2	3	2	1	2								1
CO 3	3	2	1	2								1
CO 4	3	2	1	2								1

Mapping of CO with PSO

ICSH1020	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	1	1	1
CO 3	2	1	1
CO 4	1	2	1

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

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

Module No	Content	RBT Level
1	Introduction to Data & Descriptive Statistics	1,2,3,5
2	Exploratory Data Analysis	1,2,3,4

3	Correlation Analysis	2,3,4,5
4	Introduction to Probability	2,3,5
5	Discrete & Continuous Probability Distribution	1,2,3,4
6	Testing of Hypothesis	1,2,3,4

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

Department of Computer Application

Course Code: ICCA1021
Course Name: Advanced Web Designing
Prerequisite Course(s): ICCA1010

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
Aim to integrate frontend, backend, and database programming concepts in details to prepare students for real-world full-stack development.

Course Content:

	Section I		
Module No.	Content	Hours	Weightage in %
1.	**Refreshing Java Script and CSS** CSS syntax, benefits, Responsive design, Bootstrap introduction, Java Script syntax, Java script inbuilt objects, Error handling and event handling, DOM, Asynchronous Programming.	07	10
2.	**Introduction to XML, AJAX and ES6:** Working with Basics of XML, Implementing Advanced Features of XML, Converting XML Documents in Other Format, Overview of AJAX, Consuming Web Services Using AJAX, Working with jQuery, Introduction to ES6,ES6 const and let, ES6 arrow functions, ES6 classes,.	08	20
3.	**React Component and Elements:** Introduction to React, Introduction to JSX, Lists and functional component in React, React DOM, Property validation, validating props with create class, Default props, Custom property validation, React state management -Introducing component state, Initializing state from properties, State within the component tree, Passing properties down the component tree, Passing data back up the component tree; Style component, dynamic style, Setting styles and class name component	08	20

Section II			
Module No.	Content	Hours	Weightage in %
4.	**Introduction to Node.js** Installing Node.js, Executing Node.js scripts, Types of variables, Functions in Node.js, Default values, Closures, Exact equality, Modules, this keyword, Prototype, Node package manager; Popular node package manager modules - Handling command line arguments, Handling date/time using moment.	07	15
5.	**Node JS in details** Events and Event Loop, timers, Error Handling, Buffers, Streams, Work with File System, Networking with Node (TCP, UDP and HTTP clients and servers), Web Module, Debugging, Node JS REST API, Sessions and Cookies, Design patterns, caching, scalability	07	20
6.	**Database Programming with Node JS and MongoDB** Basics of MongoDB, Data types, Connect Node JS with MongoDB, Operations on data (Insert, Find, Query, Sort, Delete, Update) using Node JS	08	15
	Total	45	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Create a responsive webpage with a navbar, carousel, and footer using Bootstrap. Ensure the layout adjusts for mobile and desktop views.	6
2.	Build a dynamic to-do list application where users can add, edit, and delete tasks. Use JavaScript for DOM manipulation and event handling.	6
3.	Develop a webpage that fetches and displays data (e.g., user profiles) from a public API (like GitHub API) using fetch() or axios.	6
4.	Create a React application that displays a list of products. Use functional components, JSX, and props to render product details dynamically.	6
5.	Develop a React app for a counter with increment, decrement, and reset buttons. Implement state management within components.	6
6.	Build a basic REST API in Node.js for managing a library system (CRUD operations for books).	8
7.	Connect a Node.js application to a MongoDB database. Perform CRUD operations (Insert, Read, Update, Delete) on a "Students" collection.	10
8.	Develop a full-stack web application (e.g., a task management system) with the following features: ● **Frontend:** React for UI. ● **Backend:** Node.js REST API. ● **Database:** MongoDB for storing task details.	10

		TOTAL	60

Text Book (s):

Title	Author/s	Publication
The Road to Learn React Your Journey to Master Plain Yet Pragmatic React.js	Robin Wieruch	Zaccheus Entertainment
HTML 5 Black Book: Covers CSS3, Javasvript, XML, XHTML, AJAX, PHP and jQuery.	DT Editorial Services	Dreamtech Press

Reference Book (s):

Title	Author/s	Publication
Beginning Node.js	Basarat Syed	Apress
Practical Node.js: Building Real-World Scalable Web Apps	AzatMardan	Apress
Learning React: Functional Web Development with React and Redux	Alex Banks, Eve Porcello	O'Reilly Media, Inc.
Advanced Web Development with React: SSR and PWA with Next.js using React with advanced concepts (English Edition)	Mehul Mohan	BPB Publication.

Web Material Link(s):

https://react.dev/
https://getbootstrap.com/docs/5.3/getting-started/introduction/
https://nodejs.org/docs/latest/api/

Course Evaluation:

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

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

Course Outcome(s):

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

ICCA1021	Advanced Web Designing
CO 1	Apply modern CSS and JavaScript for responsive, event-driven web interfaces.

CO 2	Utilize ES6 features and React for developing single-page applications.
CO 3	Manage React components, state, props, and dynamic styling.
CO 4	Execute Node.js scripts, manage modules, and handle command-line arguments.
CO 5	Design scalable Node.js applications with REST APIs, sessions, and file systems.

Mapping of CO with PO

ICCA1021	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	2	3							2
CO 2	3	3	3		3							2
CO 3	3	3	3		3					2		2
CO 4	3	3	2	3	3							2
CO 5	3	3	3	3	3					2	2	2

Mapping of CO with PSO

ICCA1021	PSO1	PSO2	PSO3
CO 1	1	2	3
CO 2	1		3
CO 3	1	3	2
CO 4	1		
CO 5	1	2	3

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

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

Module No	Content	RBT Level
1	Refreshing Java Script and CSS	1,2
2	Introduction to React and ES6	2
3	React Component and Elements:	2.3
4	Introduction to Node.js	1,2
5	Node JS in details	2,3,4,6
6	Database Programming with Node JS and MongoDB	3,4,5,6

Department of Information Technology

Course Code: ICIT1020
Course Name: Digital Marketing
Prerequisite Course(s): --

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- equip students with a comprehensive understanding of digital marketing concepts
- develop practical skills in using digital marketing platforms
- expose students to emerging trends and technologies

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Digital Marketing** Definition and Importance of Digital Marketing. Traditional Marketing vs Digital Marketing Current Trends and Career Opportunities in Digital Marketing	3	6
2.	**Search Engine Optimization (SEO) & Web Analytics** Search Engine Optimization Fundamentals. Keywords and SEO Content Plan. Writing SEO Content. On-site & Off-site SEO. Optimize Organic Search Ranking. Google Analytics Tools. Web Analytics Tools	8	20
3.	**Display Marketing** Display Ads – Concepts and Types. Buying Models (CPC, CPM, CPL, CPA). Targeting Display Ads. Programmable Digital Marketing. Analytical Tools. YouTube Marketing.	6	12
4.	**Search Engine Marketing (SEM)** Pay-Per-Click (PPC) Advertising. Understanding Quality Score and Ad Rank Budget Planning and Bidding Strategies. Social Media Advertising (Facebook Ads, Instagram Ads, LinkedIn Ads). Analytics for Social Media Campaigns	6	12

Section II			
Module No.	Content	Hours	Weightage in %
5.	**Email Marketing and Content Marketing** Email Marketing Basics and Best Practices. Tools for Email Campaigns. Content Creation for Social Media. Content Marketing Strategies. Blog Writing and Content Optimization.	7	15
6.	**Mobile Marketing** Mobile Advertising Concepts. Forms of Mobile Marketing & Features. Mobile Campaign Development. Mobile Advertising Analytics. Mobile-Friendly Content Strategies. Google Analytics & Google AdWords	8	20
7.	**Emerging Trends in Digital Marketing** Artificial Intelligence and Automation in Marketing. Voice Search Optimization. Introduction to Affiliate Marketing. Overview of Influencer Marketing. Data-Driven Marketing. Social Commerce.	7	15
	TOTAL	**45**	**100**

List of Practical:

Sr. No	Name of Practical	Hours
1.	Practical Task: Develop a digital marketing strategy for a fictional business, outlining goals, target audience, and key performance indicators (KPIs).	04
2.	Compare a traditional marketing campaign with a digital marketing campaign. Analyze the differences in reach, cost, and audience engagement.	04
3.	Conduct a SWOT analysis for a business considering digital marketing. Identify potential opportunities and challenges in the digital landscape.	04
4.	Research and present a case study on a brand that successfully leveraged current digital trends (e.g., influencer marketing, user-generated content).	04
5.	Explore and discuss the ethical considerations of digital marketing. Create guidelines for responsible and ethical marketing practices.	04
6.	Develop a timeline showcasing the evolution of digital marketing tools and technologies. Highlight key milestones and their impact.	04
7.	Analyze how technological advancements drive changes in consumer behavior. Propose strategies for adapting marketing efforts to these changes.	04
8.	Apply a digital marketing framework (e.g., RACE model) to a real-world scenario. Develop a campaign using the framework and measure its effectiveness.	04
9.	Set up a Google Ads campaign for a business. Choose relevant keywords, set a budget, and monitor campaign performance.	04
10.	Optimize a pay-per-click (PPC) campaign by adjusting bids, improving ad relevance, and implementing ad extensions.	04
11.	Analyze the performance of a YouTube marketing campaign using YouTube	04

	Analytics. Identify trends and areas for optimization.	
12.	Develop a location-based marketing strategy. Consider features like push notifications or mobile wallet integration to enhance user experience.	04
13.	Use mobile advertising analytics tools to track user engagement and conversion rates. Adjust the campaign based on the insights gained.	04
14.	Implement tracking codes and tags for a website using Google Analytics. Verify the accuracy of data collection.	04
15.	Analyze a marketing campaign using a multichannel attribution model. Determine the contribution of each channel to conversions.	04
	TOTAL	**60**

Text Book (s):

Title	Author/s	Publication
Digital Marketing	Seema Gupta	Mc-GrawHill,1st Edition – 2017

Reference Book (s):

Title	Author/s	Publication
Digital Marketing: A Practical Approach	Alan Charlesworth	Routledge-2023
Fundamentals of Digital Marketing	Puneet Singh Bhatia	Pearson 1st Edition-2017
The Art of Digital Marketing	Ian Dodson	Wiley

Web Material Link(s):
- https://neilpatel.com/what-is-digital-marketing/
- https://www.investopedia.com/terms/d/digital-marketing.asp

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 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Examination.
- Viva/Oral performance consists of 30 marks during End Semester Examination.

Course Outcome(s):

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

ICIT1020	DIGITAL MARKETING
CO 1	Gain a deep understanding of digital marketing concepts, tools, and strategies.
CO 2	Develop the skills to create and manage effective digital marketing campaigns across various platforms.
CO 3	Learn to analyze and optimize marketing performance using web analytics and SEO techniques.
CO 4	Able to design mobile-friendly and location-based marketing strategies for enhanced user engagement.
CO 5	Equipped to adapt marketing strategies based on emerging trends such as AI, voice search, and influencer marketing.

Mapping of CO with PO

ICIT1020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2				1		2		2		
CO 2	3	3	2	2						2	1	2
CO 3			3	2		2		1				2
CO 4	1		2	3		2		2				
CO 5	2	3	3	3	2					2	2	

Mapping of CO with PSO

ICIT1020	PSO1	PSO2	PSO3
CO 1	3		
CO 2	3	2	
CO 3		3	
CO 4		2	2
CO 5	2		3

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

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

Module No	Content	RBT Level
1	Introduction to Digital Marketing	1,2
2	Search Engine Optimization (SEO) & Web Analytics	3,4
3	Display Marketing	3,4
4	Search Engine Marketing (SEM)	3,4
5	Email Marketing and Content Marketing	3,5

6	Mobile Marketing	3,4
7	Emerging Trends in Digital Marketing	2,5,6

Department of Information Technology

Course Code: ICIT1031
Course Name: Object Oriented Programming with C++
Prerequisite Course(s): ICIT1010

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	04	-	05	40	60	40	60	0	0	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, Inheritance

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basic concepts of Object-Oriented Programming** Introduction OOP, Procedural Vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP	3	10
2.	**Introduction to C++** Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures	4	13
3.	**Functions** Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments, friend functions, virtual functions	6	15
4.	**Object and classes** Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, type conversion	5	15
Section II			
Module No.	Content	Hours	Weightage in %
5.	**Inheritance** Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class,	8	13

6.	**Polymorphism** Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism	5	10
7.	**I/O and File management** Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators, File stream, C++ File stream classes, File management functions, File modes, Binary and random Files	7	12
8.	**Templates, Exceptions and STL** What is template? function templates and class templates, Introduction to exception, try-catch throw, multiple catch, catch all, rethrowing exception, implementing user defined exceptions, Overview and use of Standard Template Library	7	12
	TOTAL	45	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to C++ basic input/output functions, library files.	4
2.	Implementation of C++ programs with classes and objects.	4
3.	Implement C++ programs to demonstrate use of data types, tokens and constants.	4
4.	Implementation of C++ programs to demonstrate dynamic initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator.	4
5.	Implementation of C++ programs to demonstrate use of member referencing, operators – Memory Management Operators – manipulators.	4
6.	Implementation of C++ programs for call by reference and return by reference	4
7.	Implement of C++ programs for use of inline function	4
8.	Implementation of C++ programs to demonstrate use of function overloading.	4
9.	Implementation of C++ programs to demonstrate use of virtual function.	4
10.	Implementation of C++ programs to demonstrate static data members, friend function.	4
11.	Implementation of C++ programs to demonstrate constructors and destructors.	4
12.	Implementation of file handling operations.	6
13.	Implement a program for type conversion between objects and basic types.	4
14.	Create a program demonstrating exception handling using try-catch-throw.	6
	TOTAL	**60**

Text Book (s):

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

Reference Book (s):

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

Web Material Link(s):
- **https://www.tutorialspoint.com/cplusplus/index.htm**
- **https://www.w3schools.com/CPP/default.asp**
- **https://www.javatpoint.com/cpp-tutorial**

Course Evaluation:

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

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

Course Outcome(s):

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

ICIT1031	OBJECT-ORIENTED PROGRAMMING WITH C++
CO1	Use advanced features like templates and exceptions to make programs, standard template library for faster development.
CO2	Use features of c++ like type conversion, inheritance, polymorphism, i/o streams and files to develop programs for real life problems.
CO3	Develop the applications using object-oriented programming with c++.
CO4	Use advance features like temples and exception to make programs supporting reusability and template library for faster development.
CO5	Develop the applications using object-oriented programming with c++.

Mapping of CO with PO

ICIT1031	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2			1	2	2	1		1			1
CO 2		1	2	2	1	2	2		1			2
CO 3	2	1	1	1	2	2	2		2			1
CO 4	1	2	2	1	1	0	1		2			1
CO 5	2	3	2	2	3	2	3		2			2

Mapping of CO with PSO

ICIT1031	PSO1	PSO2	PSO3
CO 1	3	3	2

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

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

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

Module No	Content	RBT Level
1	Basic concepts of Object-Oriented Programming	1,2
2	Introduction to C++	2,3
3	Function	2,3.5.6
4	Objects and Classes	1,2,3
5	Inheritance	1,2,6
6	polymorphism	2,3,4,6
7	I/O and File Management	1,2,5
8	Templates, Exceptions and STL	1,2,3,6