Sant Baba Bhag Singh

UNIVERSITY

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PO, PEO, PSO and CO

of

(Computer Science and Applications)

Sant Baba Bhag Singh University
Village Khiala
P.O. Padhiana
Distt. Jalandhar

Seen
(Dr. Seema - Dean)

SANT BABA BHAG SINGH UNIVERSITY, KHIALA -1430030, JALANDHAR		
Institute Name:		**University Institue of Computer Application and Information Sciences**
Department Name:		**Computer Science and Applications**
Programme Name:		**B.Sc(IT)**
Number of Semetsers		**6**
Vision:		**Our Vision** To be renowned itself as a reputed organization in computer education and research aimed towards betterment of society.
Mission:		Our mission is to provide a high-quality undergraduate and post graduate education in computer science & application that provides all-round growth of an individual by creating futuristic environment that fosters critical thinking, dynamism and innovation to transform them into globally competitive professionals and empowering the youth in rural communities with computer education.
Details of Programme Educational Objectives,Program Outcomes,Program Specific Outcomes		
S.No.	**Programme Educational Objective (PEO) (The Graduate/Undergraduate will....)**	
1	PEO1.	Analyze real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable.
	PEO2.	To teach students different programming skills, such as evaluating, designing and creating creative technological applications to satisfy the needs of the industry
	PEO3	Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning.
	PEO4	Motivate students to have interaction and paintings effectively inside the nearby, social and environmental framework in groups of multidisciplinary fields.
	Programme Outcomes (PO)(At the end of Programme/Degree mentioned above , the graduates will be able to .....)	
	PO1.	Coding skills: Use computer programming and simulation to clear up technical issues.
	PO2.	An ability to analyze a problem, and identify and formulate the computing requirements appropriate to its solution..

2	PO3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
	PO4	An ability to design and conduct experiments, as well as to analyze and interpret data.
	Programme Specific Outcomes (PSO)	
3	PSO1.	Design, develop and implement interdisciplinary application software projects to meet the demands of industry requirements using modern tools and technologies.
	PSO2.	Refer the scientific principles of computer science to the real life challenges of simulation and designing solutions.
	PSO3	Provide society-oriented approaches that are user friendly and require internet, networking, AI, software or cloud related approaches.
	PSO4	Analyze the societal needs to provide novel solutions through technological based research.

04/10/21

(Dean - Dr. Seema Garg)

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B Sc IT CO

Details of Course Outcomes					
S. No	Semester	Course Name	Course Code	Course Outcomes	
1	1	Communication Skills-I	ENG121	CO1	Have fairly good proficiency in reading comprehension
				CO2	Have enhanced writing skills and command in official/ corporate communication
				CO3	Develop confidence in making presentation: oral or documentary.
2	1	Introduction to Information Theory and Applications	CSA131	CO1	Bridge the fundamental concept of computers.
				CO2	Familiarize and peripheral devices and operating systems
				CO3	Understand and implement ms-office concepts
3	1	Introduction to Programming Language	CSA133	CO1	Illustrate the flowchart and to develop C programs
				CO2	Develop conditional and iterative statements to write C programs and exercise user defined functions to solve real time problems
				CO3	Inscribe C programs that use Pointers to access arrays, strings and functions
				CO4	Exercise user defined data types including structures and unions to solve problems.
4	1	Digital Electronics	CSA111	CO1	Develop a digital logic
				CO2	Apply it to solve real life problems
				CO3	Understand basic concepts of microprocessor
				CO4	Understand, analyze and design various combinational and sequential circuits
5	1	Basic Mathematics	MAT105	CO1	Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions
				CO2	Equip the student with skills to analyze problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof
				CO3	Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields
6	1	Communication Skills-1	ENG123	CO1	Have fairly good proficiency in reading comprehension
				CO2	Have enhanced writing skills and have command in official/ corporate communication
				CO3	Develop confidence in making presentation; oral or documentary
7	2	Object Oriented Programming Structure	CSA132	CO1	Understand how C++ improves C with object-oriented features.
				CO2	Learn how to write inline functions for efficiency and performance
				CO3	Learn the syntax and semantics of the C++ programming language
				CO4	Learn how to design C++ classes for code reuse.
8	2	Fundamental of Operating System	CSA136	CO1	Identify and use unix/linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security
				CO2	Effectively use the unix/linux system to accomplish typical personal, office, technical, and software development tasks
				CO3	Monitor system performance and network activities.
9	2	Data Communication and Networks	CSA134	CO1	To focus on information sharing and networks.
				CO2	Describe the functions of each layer of OSI and TCP/IP model.
				CO3	Describe various layers and services provided by them in detail.
				CO4	Understand the various protocols that are used in application layer.
10	2	Communication Skills-I	ENG114	CO1	Have fairly good proficiency in reading comprehension.
				CO2	Have enhanced writing skills and have command in official/ corporate communication
				CO3	Develop confidence in making presentation; oral or documentary.
		Introduction to Web		CO1	Use knowledge of HTML and CSS code and an HTML editor to create personal and/or business websites following professional and industry standards

		Introduction to Web Development	CSA106	CO2	Use critical thinking skills to design and create websites
				CO3	Develop a dynamic webpage by the use of java script
				CO4	Gain knowledge about web hosting.
12	3	Communication Skills-II	ENG116	CO1	Have fairly good proficiency in reading comprehension
				CO2	Have enhanced writing skills and have command in official/ corporate communication
				CO3	Develop confidence in making presentation; oral or documentary.
13	3	Data Structure	CSA201	CO1	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory
				CO2	Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
				CO3	Demonstrate different methods for traversing trees
14	3	Concept of Computer Architecture	CSA203	CO1	Understand the theory and architecture of central processing unit.
				CO2	Analyze some of the design issues in terms of speed, technology, cost, performance
				CO3	Learn the concepts of parallel processing, pipelining and interprocessor communication
15	3	Fundamentals of Database Management Systems	CSA205	CO1	Explain the features of database management systems and Relational database.
				CO2	Design conceptual models of a database using ER modeling and also construct queries in Relational Algebra
				CO3	Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
				CO4	Formulate query, using SQL, solutions to a broad range of query and data update problems.
16	3	Essentials of Management	MGT003	CO1	The students will able to recognize the role of a manager and how it relates to the organization's mission.
				CO2	The students will define management, its four basic functions and skills.
				CO3	The students will know critical management theories and philosophies and how to apply them
17	3	Gender Equity	SSC001	CO1	Understand the concept of women empowerment.
				CO2	Learn how to develop the overall personality of the women
				CO3	Understand the impact of development on gender
				CO4	Know about the policies on women rights and role of UN in establishing gender equality
18	3	Ruby on Rail	CSA215	CO1	Learn to program in ruby
				CO2	Understand the rails framework
				CO3	Harness the speed and ease of developing a rails application
19	3	Introduction to Mobile Computing	CSA231	CO1	Explain the principles and theories of mobile computing technologies.
				CO2	Describe infrastructures and technologies of mobile computing technologies.
				CO3	List applications in different domains that mobile computing offers to the public, employees, and businesses.
20	3	Software Testing	CSA233	CO1	Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
				CO2	Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
				CO3	Communicate effectively with a range of audiences
				CO1	Understand fundamentals of wireless communications.

21	3	Wireless Communication Networks	CSA221	CO2	Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks
				CO3	Demonstrate basic skills for cellular networks design. And to apply knowledge of TCP/IP extensions for mobile and wireless networking.
				CO4	Apply knowledge of TCP/IP extensions for mobile and wireless networking
22	4	Python	CSA202	CO1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements
				CO2	Express proficiency in the handling of strings and functions.
				CO3	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets
				CO4	Identify the commonly used operations involving file systems and regular expressions.
23	4	Software Engineering	CSA204	CO1	Define various software application domains and remember different process models that are used in software development.
				CO2	Explain the need of software specifications. Moreover, they can classify different types of software requirements and their gathering techniques.
				CO3	Convert the requirements model into the design model and demonstrate use of software and user interface design principles
				CO4	Distinguish between SCM and SQA and can also able to classify different testing strategies and statics.
24	4	Programming in PHP	CSA206	CO1	Design a basic website using HTML5 and CSS3 to demonstrate responsive web design
				CO2	Implement dynamic web pages with validation using JavaScript objects by applying different event handling mechanism.
				CO3	Develop simple web application using server side PHP programming and Database Connectivity using MySQL
				CO4	Build well-formed XML Document and implement Web Service using Java
25	4	System Programming	CSA232	CO1	Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger
				CO2	Describe the various concepts of assemblers and macro processors
				CO3	Understand the various phases of compiler and compare its working with assembler
26	4	Mobile Architecture & Security	CSA238	CO1	Understand fundamentals of wireless communications
				CO2	Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
				CO3	Demonstrate basic skills for cellular networks design.
27	4	Parallel Computing	CSA216	CO1	Construct and use the parallel computers
				CO2	Use the content and terminology for how one measures the performance of parallel algorithms and parallel computers
				CO3	Develop computer programs for different processors
28	4	Introduction to PL	CSA240	CO1	Enhance the knowledge and understanding of database analysis and design
				CO2	Enhance the knowledge of the processes of database development and administration using SQL and PL/SQL
				CO3	Enhance programming and database skills using SQL and PL/SQL
29	4	Network Security &Cryptography	CSA220	CO1	Classify the symmetric encryption techniques
				CO2	Illustrate various public key cryptographic techniques
				CO3	Evaluate the authentication and hash algorithms
				CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.

[illegible]	[illegible]	Fundamentals of Computer Graphics	CSA301	CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis
				CO3	Use the geometric transformations on graphics objects.
				CO4	Extract scene with different clipping methods
31	5	Human Values & Professional Skills	SSC005	CO1	Inculcate the values and professional ethics in the students
				CO2	Help students to understand the harmony in the Human Being
				CO3	Help students to understand the harmony in the Family and Society
32	5	Java	CSA305	CO1	Know the structure and model of the Java programming language, (knowledge)
				CO2	Use the Java programming language for various programming technologies (understanding)
				CO3	Develop software in the Java programming language, (application)
				CO4	Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
33	5	Digital Marketing	CSA307	CO1	Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities.
				CO2	Explain emerging trends in digital marketing and critically assess the use of digital marketing tools by applying relevant marketing theories and frameworks.
				CO3	Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked.
				CO4	Interpret the traditional marketing mix within the context of a changing and extended range of digital strategies and tactics.
34	5	Environmental Science	EVS001	CO1	To connect and sensitize the students towards the environment and prevailing environmental issues (natural, physical, social and cultural).
35	5	Distributed DBMS	CSA313	CO1	Know and understand how to apply normalization techniques.
				CO2	Understand the how transactions are processed in a database.
				CO3	Explain the concepts of Distributed Databases and Data Warehousing with some database security issues
				CO4	Enhance their cognitive skills (thinking and analysis).
36	5	Theory of Computation	CSA333	CO1	Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving
				CO2	Explain the models of computation, including formal languages, grammars and automata, and their connections
				CO3	State and explain the church-turing thesis and its significance
37	5	Programming for Mobile Device	CSA335	CO1	Determine solutions using problem solving principles, logic and systematic methodologies
				CO2	Evaluate the architecture and principles of operation of computer systems and networks
				CO3	Study the iOS applications and infrastructure
38	5	E-Commerce	CSA319	CO1	Understand the basic concepts and technologies used in the field of management information systems
				CO2	Have the knowledge of the different types of management information systems
				CO3	Understand the processes of developing and implementing information systems
				CO4	Be aware of the ethical, social, and security issues of information systems
39	5	Introduction to MATLAB Language	CSA337	CO1	Use MATLAB for interactive computations
				CO2	Familiar with memory and file management in MATLAB
				CO3	Generate plots and export this for use in reports and presentations

[illegible]	[illegible]	Multimedia System	CSA339	CO1	Learn and understand technical aspect of multimedia systems
				CO2	Understand the standards available for different audio,. developed understanding of technical aspect of multimedia systems
				CO3	Design and develop various multimedia systems applicable in real time
41	5	Image and speech recognition	CSA327	CO1	Express the speech signal in terms of its time domain and frequency domain representations and the different ways in which it can be modeled
				CO2	Derive expressions for simple features used in speech classification applications.
				CO3	Explain the operation of example algorithms covered in lectures, and discuss the effects of varying parameter values.
				CO4	Synthesize the block diagrams for speech applications, explain the purpose of the various blocks, and describe in detail algorithms that could be used to implement them
41	6	Android	CSA302	CO1	Experiment on Integrated Development Environment for Android Application Development
				CO2	Design and Implement User Interfaces and Layouts of Android App
				CO3	Use Intents for activity and broadcasting data in Android App and Design and Implement Database Application and Content Providers
				CO4	Experiment with Camera and Location Based service and Develop Android App with Security features
42	6	Artificial Intelligence	CSA304	CO1	Explain what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence
				CO2	Explain how Artificial Intelligence enables capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.
				CO3	Use classical Artificial Intelligence techniques, such as search algorithms, mini-max algorithm, neural networks, tracking, and robot localization
				CO4	Apply Artificial Intelligence techniques for problem solving
43	6	Introduction to ASP.net	CSA332	CO1	Create a web form with server controls
				CO2	Separate page code from content by using code-behind pages, page controls, and components
				CO3	Display dynamic data from a data source by using Microsoft ado.net and data binding
44	6	Human Computer Interaction	CSA341	CO1	Outline the nature of user frustration and how to reduce it
				CO2	Describe how technologies can be designed to change people's attitudes and behavior
				CO3	Consider which interface is best for a given application or activity. (ms -mem b design)
45	6	Big Data Handling	CSA316	CO1	Identify the characteristics of datasets and compare the trivial data and big data for various applications
				CO2	Select and implement machine learning techniques and computing environment that are suitable for the applications under consideration
				CO3	Understand and apply scaling up machine learning techniques and associated computing techniques and technologies
				CO4	Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.
46	6	Cyber Security	CSA320	CO1	Implement cyber security best practices and risk management
				CO2	Integrate network monitoring and present real-time solutions
				CO3	Impact cyber security risk in an ethical, social, and professional manner

[illegible]	[illegible]	[illegible] Introduction to Embedded System	CSA338	CO1	Foster ability to understand the internal architecture and interfacing of different peripheral devices with microcontrollers
				CO2	Foster ability to write the programs for microcontroller
				CO3	Foster ability to understand the role of embedded systems in industry
[illegible]	[illegible]	[illegible] Data Analysis using R Tools	CSA328	CO1	List motivation for learning a programming language
				CO2	Learn various Data Analysis Techniques.
				CO3	Import, review, manipulate and summarize data-sets in R.
				CO4	Understand item sets, Clustering, frame works & Visualizations
49	6	Hacking	CSA342	CO1	Plan a vulnerability assessment and penetration test for a network
				CO2	Assess an environment using foot printing
				CO3	Review and practice computer and network etiquette and ethics found in working environments
50	6	Introduction to Cloud Computing	CSA344	CO1	Explain the core issues of cloud computing such as security, privacy, and interoperability
				CO2	Choose the appropriate technologies, algorithms, and approaches for the related issues
				CO3	Identify problems, and explain, analyze, and evaluate various cloud computing solutions
51	6	Bioinformatics and Computational Biology	CSA346	CO1	Demonstrate mastery of the core concepts of bioinformatics
				CO2	Computational biology, database design and implementation, and probability and statistics
				CO3	Demonstrate the ability to apply skills in a professional environment via an industrial or academic internship in bioinformatics

Seen

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SANT BABA BHAG SINGH UNIVERSITY, KHIALA -1430030, JALANDHAR		
Institute Name:	**University Institue of Computer Application and Information Sciences**	
Department Name:	**Computer Science and Applications**	
Programme Name:	**BCA**	
Number of Semetsers	**6**	
Vision:	To be renowned itself as a reputed organization in computer education and research aimed towards betterment of society.	
Mission:	Our mission is to provide a high-quality undergraduate and post graduate education in computer science & application that provides all-round growth of an individual by creating futuristic environment that fosters critical thinking, dynamism and innovation to transform them into globally competitive professionals and empowering the youth in rural communities with computer education.	
Details of Programme Educational Objectives,Program Outcomes,Program Specific Outcomes		
S.No.	**Programme Educational Objective (PEO) (The Graduate/Undergraduate will....)**	
1	PEO1.	To provide the necessary skills and knowledge to the students so that they can achieve success in the rapidly growing world.
	PEO2.	By using technical methods, students are able to solve the real time computerized problems by analyzing, designing, implementing and evaluating the problems.
	PEO3	To polish their skills and knowledge this helps them to build their career in IT world.
	PEO4	To illustrate that the communication skills and critical thinking are necessary.
	Programme Outcomes (PO)(At the end of Programme/Degree mentioned above , the graduates will be able to .....)	
	PO1.	**Employability**: Students will able to get employed in public and private sector. Moreover, they will be able to set up their own business.
	PO2.	**Modern Tool Usage:** Students will able to cope up with new tools and techniques under which they use appropriate techniques to understand the complex engineering activities with their limitations.

2	PO3	**Environment and Sustainability:** To find the solution of problems in such a way that professional engineering solutions do not affect our environment and will able to meet the needs of future generations.
	PO4	**Design and Development of Solutions**: To layout the solutions for various IT problems and develop a new system that helps in achieving a specific requirement.
	Programme Specific Outcomes (PSO)	
3	PSO1.	**To cover the vast area of computer application with experience that help in building their successful career. Moreover, it also helps in their higher education and setting up their own business.**
	PSO2.	**Students will able to choose the data model with appropriate architecture and implement a system with high efficiency**
	PSO3	**Prepare user familiar solutions for the society which is based on machine learning.**
	PSO4	**Make it possible to find the solutions for complicating hardware and software problems.**

04/10/21

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BCA

Details of Course Outcomes					
Sr. No.	**Semester**	**Course Name**	**Course Code**	**Course Outcomes**	
1	1	Communication Skills I	ENG121*	CO1	Equip the learner with proficiency in reading comprehension
				CO2	Enable the learner with improved writing skills and command over official/ corporate communication
				CO3	Enhance the learners' range of vocabulary and knowledge of the essentials of grammar
2	1	Fundamentals of Computer	CSA101	CO1	Bridge the fundamental concept of computers
				CO2	Familiarize with peripheral devices.
				CO3	Understand and implement MS-Office concepts
				CO4	Learn basics of operating system.
3	1	Garphics Tools	CSA103	CO1	Use knowledge of HTML and CSS code and an HTML editor to create personal and/or business websites following professional and industry standards
				CO2	Implement HTML coding and its tags.
				CO3	Use critical thinking skills to design and create websites
				CO4	Understand cascading style sheets and javascript with HTML
4	1	Computer Programming	CSA105	CO1	Illustrate the flowchart and to develop C programs.
				CO2	Develop conditional and iterative statements to write C programs and exercise user defined functions to solve real time problems
				CO3	Inscribe C programs that use Pointers to access arrays, strings and functions.
				CO4	Exercise user defined data types including structures and unions to solve problems.
5	1	Communication Skills-I	CSA123	CO1	Have fairly good proficiency in reading comprehension
				CO2	Have enhanced writing skills and have command in official/ corporate communication
				CO3	Develop confidence in making presentation; oral or documentary.
6	1	DIGITAL ELECTRONICS	CSA111	CO1	Have fairly good proficiency in comprehending digital circuits design.
				CO2	Have enhanced analytical skills and have command in basics for digital elctronics.
				CO3	Develop confidence in computer hardware sufficient to meet software requirements.
				CO1	Understand how C++ improves C with object-oriented features.

		Programming in C++	CSA102	CO2	Learn how to write inline functions for efficiency and performance.
				CO3	Learn the syntax and semantics of the C++ programming language.
				CO4	Learn how to design C++ classes for code reuse.
8	2	Computer Networks	CSA104	CO1	To focus on information sharing and networks.
				CO2	Describe the functions of each layer of OSI and TCP/IP model
				CO3	Describe various layers and services provided by them in detail
				CO4	Understand the various protocols that are used in application layer.
9	2	Communication skills-II	ENG114*	CO1	Have fairly good proficiency in reading comprehension
				CO2	Have enhanced writing skills and have command in official/ corporate communication.
				CO3	Develop confidence in making presentation; oral or documentary
10	2	Statistical Techniques in Computer Science	MAT108	CO1	Recognize the error in the number generated by the solution
				CO2	Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Rapshon method
				CO3	Apply method of interpolation and extrapolation for prediction
				CO4	Calculate mean, median and mode for individual series.
11	2	Introduction to Web Development	CSA106	CO1	Use knowledge of HTML and CSS code and an HTML editor to create personal and/or business websites following professional and industry standards.
				CO2	Use critical thinking skills to design and create websites
				CO3	Develop a dynamic webpage by the use of java script
				CO4	Gain knowledge about web hosting.
12	3	Data Structures	CSA201	CO1	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
				CO2	Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
				CO3	Demonstrate different methods for traversing trees
				CO4	Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing
13	3	Concept of Computer Architecture	CSA203	CO1	Understand the theory and architecture of central processing unit
				CO2	Analyze some of the design issues in terms of speed, technology, cost, performance
				CO3	Learn the concepts of parallel processing, pipelining and inter-processor communication

				CO4	Understand the basics of hardwired and micro-programmed control of the CPU
14	3	Fundamentals of Database Management Systems	CSA205	CO1	Explain the features of database management systems and Relational database.
				CO2	Design conceptual models of a database using ER modeling and also construct queries in Relational Algebra
				CO3	Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
				CO4	Formulate query, using SQL, solutions to a broad range of query and data update problems.
15	3	System Analysis & Design	CSA207	CO1	Gather data to analyze and specify the requirements of a system.
				CO2	Design system components and environments.
				CO3	Design models that assist programmers in implementing a system
				CO4	Build general and detailed design a database for storing data, a user interface for data input and output, and controls to protect the system and its data.
16	3	Gender Equity	SSC001	CO1	Understand the concept of women empowerment.
				CO2	Learn how to develop the overall personality of the women.
				CO3	Understand the impact of development on gender.
				CO4	Know about the policies on women rights and role of UN in establishing gender equality
17	3	Ruby on Rail	CSA215	CO1	Develop and test programs using the Ruby programming language
				CO2	Develop, test, and deploy basic web applications with Ruby on Rails (RoR).
				CO3	Develop, test, and deploy web layout and user models using RoR
				CO4	Create an advanced project using MySQL, Ruby and the Ruby on Rails framework.
18	3	Mobile Computing	CSA217	CO1	Describe the basic concepts and principles in mobile computing
				CO2	Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks
				CO3	Explain the structure and components of Mobile IP and Mobility Management
				CO4	Know the list of applications that mobile computing offers in different domains
19	3	PL	CSA219	CO1	Learn programming, management, and security issues of working with PL/SQL program units.
				CO2	Implement the built-in packages that come with Oracle

				CO3	Understand triggers and stored procedure features
				CO4	Enhance Programming and Software Engineering skills and techniques using SQL and PL/SQL.
20	3	Wireless Commmunication Networks	CSA221	CO1	Understand fundamentals of wireless communications.
				CO2	Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
				CO3	Demonstrate basic skills for cellular networks design. And to apply knowledge of TCP/IP extensions for mobile and wireless networking.
				CO4	Apply knowledge of TCP/IP extensions for mobile and wireless networking.
21	4	Python	CSA202	CO1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements
				CO2	Express proficiency in the handling of strings and functions.
				CO3	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets
				CO4	Identify the commonly used operations involving file systems and regular expressions
22	4	Software Engineering	CSA204	CO1	Define various software application domains and remember different process models that are used in software development
				CO2	Explain the need of software specifications. Moreover, they can classify different types of software requirements and their gathering techniques.
				CO3	Convert the requirements model into the design model and demonstrate use of software and user interface design principles
				CO4	Distinguish between SCM and SQA and can also able to classify different testing strategies and statics.
23	4	Programming with PHP	CSA206	CO1	Design a basic website using HTML5 and CSS3 to demonstrate responsive web design.
				CO2	Implement dynamic web pages with validation using JavaScript objects by applying different event handling mechanism.
				CO3	Develop simple web application using server side PHP programming and Database Connectivity using MySQL
				CO4	Build well-formed XML Document and implement Web Service using Java
				CO1	Describe the importance of computer system resources and the role of operating system in their management policies and algorithms

24	4	Operating System	CSA222	CO2	Understand the process management policies and scheduling of processes by CPU
				CO3	Evaluate the requirement for process synchronization and coordination handled by operating system
				CO4	Describe and analyze the memory management and its allocation policies.
25	4	LINUX	CSA214	CO1	Explain the fundamental concepts of open-source operating system Linux
				CO2	Understand the basic set of commands and editors in Linux operating system
				CO3	Discuss shell programming in Linux operating system
				CO4	Demonstrate the role and responsibilities of a Linux system administrator.
26	4	Parallel Computing	CSA216	CO1	Optimize sequential code for fastest possible execution
				CO2	Analyze sequential programs and determine if they are worthwhile to parallelize
				CO3	Develop, analyze, and implement algorithms for parallel computers
				CO4	Analyze and perform development work related to the use of parallel computers
27	4	Software Testing and Maintenance	CSA218	CO1	Describe key techniques and standards in software testing.
				CO2	Explain and evaluate strategies for software testing for both complete program life cycles and individual phases
				CO3	Develop correct, stable, maintainable and efficient software that extends or improves existing code
				CO4	Specify and design test cases and test, debug and optimize programs and produce appropriate documentation for test management, including test plans, test schedules and test progress monitoring
28	4	Network Security and Cryptography	CSA220	CO1	Provide security to the data over the network.
				CO2	Do research in the emerging areas of cryptography and network security
				CO3	Implement various networking protocols
				CO4	Protect any network from the threats in the world
29	5	Fundamentals of Computer Graphics	CSA301	CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics
				CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis
				CO3	Use the geometric transformations on graphics objects.
				CO4	Extract scene with different clipping methods

30	5	Java	CSA305	CO1	Know the structure and model of the Java programming language, (knowledge)
				CO2	Use the Java programming language for various programming technologies (understanding)
				CO3	Develop software in the Java programming language, (application)
				CO4	Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
31	5	Digital Marketing	CSA307	CO1	Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities.
				CO2	Explain emerging trends in digital marketing and critically assess the use of digital marketing tools by applying relevant marketing theories and frameworks
				CO3	Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked.
				CO4	Interpret the traditional marketing mix within the context of a changing and extended range of digital strategies and tactics.
32	5	Environmental Science	EVS001	CO1	To connect and sensitize the students towards the environment and prevailing environmental issues (natural, physical, social and cultural).
33	5	Distributed DBMS	CSA313	CO1	Know and understand how to apply normalization techniques
				CO2	Understand the how transactions are processed in a database.
				CO3	Explain the concepts of Distributed Databases and Data Warehousing with some database security issues
				CO4	Enhance their cognitive skills (thinking and analysis).
34	5	System Simulation & Modeling	CSA315	CO1	Understand different methods for random number generation with a clear understanding of the need for the development process to initiate the real problem. Moreover, they have a clear understanding of principle and techniques of simulation methods informed by research direction
				CO2	Enhance their Cognitive skills (thinking and analysis)
				CO3	Know how to simulate any discrete system using queuing systems and also able to work effectively with others
				CO4	Model any system from different fields with numerical algorithm to meet simple requirements, expressed in English. They are also able to discuss the simulation methods and select the suitable technique on the problems

35	5	Embedded System	CSA317	CO1	Understand basic concepts in the embedded computing systems area.
				CO2	Determine the optimal composition and characteristics of an embedded system
				CO3	Design and program an embedded system at the basic level and develop hardware-software complex with the use of the National Instruments products
				CO4	Foster ability to write the programs for microcontroller. Foster ability to understand the role of embedded systems in industry.
36	5	E-Commerce	CSA319	CO1	Understand the basic concepts and technologies used in the field of management information systems
				CO2	Have the knowledge of the different types of management information systems
				CO3	Understand the processes of developing and implementing information systems
				CO4	Be aware of the ethical, social, and security issues of information systems
37	5	Ethical Hacking	CSA321	CO1	Identify and analyze the stages an ethical hacker requires to take in order to compromise a target system
				CO2	Identify tools and techniques to carry out a penetration testing
				CO3	Critically evaluate security techniques used to protect system and user data
				CO4	Demonstrate systematic understanding of the concepts of security at the level of policy and strategy in a computer system.
38	5	Multimedia	CSA323	CO1	Understand the characteristics of different media with representations of different multimedia data and data formats
				CO2	Understand the characteristic of human visual system with the characteristics of human's audio system. They will also be able to learn multimedia techniques design
				CO3	Understand different compression principles and techniques.
				CO4	Design and implement media applications
39	5	Bioinformatics	CSA325	CO1	Know and aware about the basic principles and concepts of biology, computer science and mathematics
				CO2	Understand how the existing software effectively to extract information from large databases and to use this information in computer modeling
				CO3	Enhance the Problem-solving skills, including the ability to develop new algorithms and analysis methods

				CO4	Understand the intersection of life and information sciences with the core of shared concepts, language, skills and the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries.
40	5	Image and speech recognition	CSA327	CO1	Express the speech signal in terms of its time domain and frequency domain representations and the different ways in which it can be modeled.
				CO2	Derive expressions for simple features used in speech classification applications.
				CO3	Explain the operation of example algorithms covered in lectures, and discuss the effects of varying parameter values.
				CO4	Synthesize the block diagrams for speech applications, explain the purpose of the various blocks, and describe in detail algorithms that could be used to implement them
41	6	Android	CSA302	CO1	Experiment on Integrated Development Environment for Android Application Development.
				CO2	Design and Implement User Interfaces and Layouts of Android App.
				CO3	Use Intents for activity and broadcasting data in Android App and Design and Implement Database Application and Content Providers
				CO4	Experiment with Camera and Location Based service and Develop Android App with Security features.
42	6	Artificial Intelligence	CSA304	CO1	Explain what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence
				CO2	Explain how Artificial Intelligence enables capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.
				CO3	Use classical Artificial Intelligence techniques, such as search algorithms, mini-max algorithm, neural networks, tracking, and robot localization
				CO4	Apply Artificial Intelligence techniques for problem solving.
43	6	Web technologies using with ASP.Net	CSA306	CO1	Understand the .NET framework and its runtime environment in detail.
				CO2	Understand the major aspects of C# programming language and its oriented features such as classes, objects, inheritance, and polymorphism.
				CO3	Learn how ADO.NET is used in web development using ASP.NET and understand the basic concepts in programming using VB.NET
				CO4	Understand how Object oriented programming concepts are applied in VB.NET

44	6	Big Data Handling	CSA316	CO1	Identify the characteristics of datasets and compare the trivial data and big data for various applications
				CO2	Select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.
				CO3	Understand and apply scaling up machine learning techniques and associated computing techniques and technologies.
				CO4	Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques
45	6	Cyber Security	CSA320	CO1	Explain the concepts of confidentiality, availability, and integrity (CIA) in context of Information Assurance; articulate the threats to CIA
				CO2	Explain key networking protocols, and their hierarchical relationship in the context of a conceptual model, such as the OSI and TCP/IP framework
				CO3	Articulate the low level data communications and subsequent abstractions that allow networked hosts and applications to communicate across the internet
				CO4	Identify core networking and infrastructure components, and the roles they serve; and given requirements and constraints, design an IT infrastructure including devices, topologies, protocols, systems software, management, and security
46	6	Soft Computing	CSA322	CO1	Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory
				CO2	Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic.
				CO3	Understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations.
				CO4	Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications.
47	6	Swift Programming	CSA318	CO1	Define key programming terms relevant to Swift and iOS programming.
				CO2	Describe the process of creating iOS apps.
				CO3	State the purpose of the Apple developer tools, such as Xcode, Instruments, debugger, analyzer, and iOS
				CO4	Simulator. Distinguish well-written code from poorly written code

48	6	MATLAB	CSA324	CO1	Understand the need for simulation/implementation for the verification of mathematical functions
				CO2	Understand the main features of the MATLAB/SCILAB program development environment to enable their usage in the higher learning
				CO3	Implement simple mathematical functions/equations in numerical computing environment such as MATLAB/SCILAB.
				CO4	Interpret and visualize simple mathematical functions and operations thereon using plots/display.
49	6	Cloud Computing	CSA326	CO1	Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing
				CO2	Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud.
				CO3	Explain the core issues of cloud computing such as security, privacy, and interoperability
				CO4	Choose the appropriate technologies, algorithms, and approaches for the related issues.
50	6	Data Analysis using R Tools	CSA328	CO1	List motivation for learning a programming language
				CO2	Learn various Data Analysis Techniques.
				CO3	Import, review, manipulate and summarize data-sets in R.
				CO4	Understand item sets, Clustering, frame works & Visualizations
51	6	Image Processing	CSA330	CO1	To become familiar with digital image fundamentals
				CO2	Develop any image processing application.
				CO3	To get exposed to simple image enhancement techniques in Spatial and Frequency domain
				CO4	To study the image segmentation and representation techniques
52	6	Basics of Accounting	COM003	CO1	To help the students to discriminate between valuable and superficial in the life
				CO2	To help develop the critical ability to distinguish between essence and form, or between what is of value and what is superficial, in life.
				CO3	Students will behave ethically and promote human values in society.

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(Dean)

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SANT BABA BHAG SINGH UNIVERSITY, KHIALA -1430030, JALANDHAR		
Institute Name:		**University Institue of Computer Application and Information Sciences**
Department Name:		**Computer Science and Applications**
Programme Name:		**MCA**
Number of Semetsers		6
Vision:		To be renowned itself as a reputed organization in computer education and research aimed towards betterment of society.
Mission:		Our mission is to provide a high-quality undergraduate and post graduate education in computer science & application that provides all-round growth of an individual by creating futuristic environment that fosters critical thinking, dynamism and innovation to transform them into globally competitive professionals and empowering the youth in rural communities with computer education
Details of Programme Educational Objectives,Program Outcomes,Program Specific Outcomes		
S.No.	**Programme Educational Objective (PEO) (The Graduate/Undergraduate will....)**	
1	PEO1.	Analyze real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable.
	PEO2.	To teach students different programming skills, such as evaluating, designing and creating creative technological applications to satisfy the needs of the industry
	PEO3	Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning.
	PEO4	Motivate students to have interaction and paintings effectively inside the nearby, social and environmental framework in groups of multidisciplinary fields.
	Programme Outcomes (PO)(At the end of Programme/Degree mentioned above , the graduates will be able to .....)	
2	PO1.	Coding skills Use computer programming and simulation to clear up technical issues.
	PO2.	An ability to analyze a problem, and identify and formulate the computing requirements appropriate to its solution..
	PO3	An ability to design, implement, and evaluate a computer-based system, process, comnent, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
	PO4	An ability to design and conduct experiments, as well as to analyze and interpret data.

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	Programme Specific Outcomes (PSO)	
3	PSO1.	Enable the students to select the suitable data model, advanced level of programming, appropriate architecture and platform to implement a system with good performance
	PSO2.	Apply the theoretical foundations of computer science in modelling and developing solutions to the real world problems.
	PSO3	Provide user friendly and need based mobile, networking, AI, web or cloud based solutions to the society.
	PSO4	Explore technical knowledge in diverse areas of Computer Applications and experience an environment conducive in cultivating skills for successful career, entrepreneurship and higher studies.

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MCA PSO

Details of Course Outcomes					
S. No	Semester	Course Name	Course Code	Course Outcomes	Detail
1	1	MAT551	Mathematical Foundations of Computer Science	CO1	Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions
				CO2	Equip the student with skills to analyze problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
				CO3	Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields
				CO4	Imbibe effective scientific and/or technical communication in both oral and writing.
2		CSA501	Programming with Python	CO1	Understand why Python is a useful scripting language for developers.
				CO2	Learn how to design and program Python applications
				CO3	Learn how to use lists, topples, and dictionaries in Python program.
				CO4	Learn how to identify Python object types
3		CSA503	Advanced Data Structures	CO1	To extrapolate from them in order to apply those algorithms and techniques to solve problems
				CO2	To extend the students' knowledge of algorithms and data structures
				CO3	To enhance their expertise in algorithmic analysis and algorithm design techniques.
				CO4	To learn a variety of useful algorithms and techniques
4	1	CSA505	Advanced Database Management System	CO1	Understand the concepts of query processing and how to convert SQL queries into relational algebra
				CO2	Understand ACID properties, concept of scheduling and concurrency control techniques.
				CO3	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
				CO4	Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing
5		CSA507	Advanced Computer Network	CO1	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
				CO2	Have a basic knowledge of the use of cryptography and network security
				CO3	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols
				CO4	Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure

6		CSA502	Advance Java	CO1	Learn the Internet Programming, using Java Applets.
				CO2	Use the Java programming language for various programming technologies (understanding).
				CO3	Develop software in the Java programming language, (application).
				CO4	Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis).
7	2	CSA504	Linux Administration	CO1	Understand the technical details of DOS, Windows and UNIX, LINUX operating system.
				CO2	Ability to use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator.
				CO3	Ability to develop IPC-API's that can be used to control various processes for synchronization.
				CO4	Know and configure the various internet services
8		CSA506	PHP	CO1	Analyze the construction of a web page and relate how PHP and HTML combine to produce the web page.
				CO2	Write regular expressions including modifiers, operators, and meta characters.
				CO3	Create PHP programs that use various PHP library functions, and that manipulate files and directories
				CO4	Analyze and solve various database tasks using the PHP language
9		SSC006	Human values& Professional Ethics	CO1	Behave ethically and promote human values in society.
				CO2	Understand harmony in the Human Being
				CO3	Behave professionally
10		EVS003	Natural Hazards and Disaster Management	CO1	Knowledge about the natural calamities and their origin
				CO2	Risk Assessment of Natural hazards
				CO3	Disaster Management and effect of Climate change
11		CSA601	Theory of Computation	CO1	Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving.
				CO2	Explain the models of computation, including formal languages, grammars and automata, and their connections
				CO3	State and explain the church-turing thesis and its significance
				CO4	Analyze and design finite automata, pushdown automata, turing machines, formal languages, and grammars.
12		CSA603	Concepts of Computer Graphics	CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics
				CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
				CO3	Use of geometric transformations on graphics objects and their application in composite form
				CO4	Extract scene with different clipping methods and its transformation to graphics display device.

13		CSA605	Android Programming	CO1	Demonstrate their understanding of the fundamentals of Android operating systems
				CO2	Demonstrate their skills of using Android software development tools
				CO3	Demonstrate their ability to develop software with reasonable complexity on mobile platform
				CO4	Demonstrate their ability to deploy software to mobile devices
14		CSA516	Cloud Computing Concepts	CO1	Understand the concepts, characteristics, delivery models and benefits of cloud computing
				CO2	Understand the different characteristics of public, private and hybrid cloud deployment models.
				CO3	Understand the key security and compliance challenges of cloud computing.
				CO4	Understand the key technical and organizational challenges
15		CSA518	Big Data Analysis	CO1	Identify the characteristics of datasets and compare the trivial data and big data for various applications
				CO2	Select and implement machine learning techniques and computing environment that are suitable for the applications under consideration
				CO3	Solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues
				CO4	Understand and apply scaling up machine learning techniques and associated computing techniques and technologies.
16		CSA520	Ruby Programming	CO1	Explore the Model-view-Controller architecture for server-side applications
				CO2	Understand the Rails Framework
				CO3	Harness the speed and ease of developing a Rails application
				CO4	Create and use XML in Rails applications.
17		CSA522	Data Warehousing and Data Mining	CO1	Understand about the need of data warehouse
				CO2	Understand the model and design of data warehouses.
				CO3	Learn algorithms for data mining.
				CO4	Apply the acquired knowledge for understanding data and select suitable methods for data analysis.
18		CSA524	Mobile Computing and wireless network	CO1	Explain the principles and theories of mobile computing technologies
				CO2	Describe infrastructures and technologies of mobile computing technologies.
				CO3	List applications in different domains that mobile computing offers to the public, employees, and businesses
				CO4	Describe the possible future of mobile computing technologies and applications
19		CSA526	Search Engine Optimization	CO1	Define search engine marketing
				CO2	Describe the history of search engine marketing
				CO3	Identify the elements of search engine marketing plan
				CO4	Generate keywords that are highly relevant to Web site

20		CSA528	Natural Language Processing	CO1	Understand approaches to syntax and semantics in NLP
				CO2	Understand approaches to discourse, generation, dialogue and summarization within NLP.
				CO3	Understand current methods for statistical approaches to machine translation.
				CO4	Understand machine learning techniques used in NLP, including hidden Markov models and probabilistic
21		CSA530	Computer and Information Security	CO1	Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications
				CO2	Gain familiarity with prevalent network and distributed system attacks, defences against them, and forensics to investigate the aftermath.
				CO3	Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today
				CO4	Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges
22		CSA611	Computational Intelligence	CO1	Describe human intelligence and AI Explain how intelligent system works.
				CO2	Apply basics of Fuzzy logic and neural networks.
				CO3	Discuss the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
				CO4	Develop some familiarity with current research problems and research methods in Soft Computing Techniques.
23		CSA613	System Analysis and Design	CO1	Explain what systems are and how they are developed.
				CO2	Identify and describe the phases of the systems development life cycle.
				CO3	Follow the analysis portion of the Systems Development Life Cycle in a disciplined manner
				CO4	Develop and evaluate system requirements
24		CSA615	MOOC	CO1	Identify and apply relevant problem solving methodologies
				CO2	Design components, systems and/or processes to meet required specifications for a web presence
				CO3	Be aware of the ethical, social, and security issues of information systems.
				CO4	Communicate effectively in ways appropriate to the discipline, audience and purpose
25		CSA617	Desigh and Analysis of Algorithm	CO1	Understand the fundamental concepts of a digital image processing system.
				CO2	Understand the concepts of image enhancement techniques
				CO3	Understand how to recognize patterns or objects.
				CO4	Know the Compression techniques and Morphological concepts
26		CSA621	Mobile architecture and Security	CO1	Understand the concept of women empowerment
				CO2	Learn how to develop the overall personality of the women
				CO3	Understand the impact of development on gender.

				CO4	Know about the policies on women rights and role of UN in establishing gender equality
27		CSA623	E-Commerce and Content Management System	CO1	Identify and apply relevant problem solving methodologies
				CO2	Design components, systems and/or processes to meet required specifications for a web presence
				CO3	Be aware of the ethical, social, and security issues of information systems.
				CO4	Communicate effectively in ways appropriate to the discipline, audience and purpose.
28		CSA625	computer Vision	CO1	Understand the fundamental concepts of a digital image processing system.
				CO2	Understand the concepts of image enhancement techniques
				CO3	Understand how to recognize patterns or objects.
				CO4	Know the Compression techniques and Morphological concepts
29		CSA627	network and Web Security	CO1	Compare, contrast, and apply the key algorithmic design paradigms: brute force, divide and conquer, decrease and conquer, transform and conquer, greedy, dynamic.
				CO2	Define, compare, analyze, and solve general algorithmic problem types: sorting, searching, string processing, graphs, and geometric.
				CO3	Compare, contrast, and apply algorithmic tradeoffs: time vs. space, deterministic vs. randomized, and exact vs. approximate.
				CO4	Compare, contrast, and apply key data structures: trees, lists, stacks, queues, hash tables and graph representations

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SANT BABA BHAG SINGH UNIVERSITY, KHIALA -1430030, JALANDHAR		
Institute Name:		**University Institue of Computer Application and Information Sciences**
Department Name:		**Computer Science and Applications**
Programme Name:		**M.Sc(IT)**
Number of Semetsers		**4**
Vision:		To be renowned itself as a reputed organization in computer education and research aimed towards betterment of society.
Mission:		Our mission is to provide a high-quality undergraduate and post graduate education in computer science & application that provides all-round growth of an individual by creating futuristic environment that fosters critical thinking, dynamism and innovation to transform them into globally competitive professionals and empowering the youth in rural communities with computer education.
Details of Programme Educational Objectives,Program Outcomes,Program Specific Outcomes		
S.No.	**Programme Educational Objective (PEO) (The Graduate/Undergraduate will....)**	
1	PEO1.	To continuously enhance academic rigor and research outcomes.
	PEO2.	Students can solve computerized problems in real time by learning, designing, implementing and checking the problems using scientific methods.
	PEO3	Upgrade their skills and knowledge to help them develop their career in files related to computers
	PEO4	To inculcate lifelong learning's.
	Programme Outcomes (PO)(At the end of Programme/Degree mentioned above , the graduates will be able to .....)	
2	PO1.	Disciplinary Knowledge: Demonstrate comprehensive knowledge of the discipline that forms a part of a postgraduate programme. Execute strong theoretical and practical understanding generated from the specific programme in the area of work.
	PO2.	Critical Thinking and Problem solving: Exhibit the skill of critical thinking and understand scientific texts and place scientific statements and themes in contexts and also evaluate them in terms of generic conventions. Identify the problem by observing the situation closely, take actions and apply lateral thinking and analytical skills to design the solutions.
	PO3	Research Related skills and scientific temper: Infer scientific literature, build a sense of enquiry and able to formulate, test, analyze, interpret and establish hypothesis and research questions; and to identify and consult relevant sources to find answers. Plan and write a research paper/project while emphasizing on academics and research ethics, scientific conduct and creating awareness about intellectual property rights and issues of plagiarism.
	PO4	Computer Applications Knowledge: To solve complex engineering problems, apply the knowledge of mathematics, physics, engineering principles and an engineering specialization.

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	Programme Specific Outcomes (PSO)	
3	PSO1.	Allow students to choose the correct data model, advanced programming level, correct architecture and framework to implement a good performing system.
	PSO2.	Illustrate an expertise in the simulation and digital transformation using computer science principles and analytical resources.
	PSO3	Provide society-orientated answers which can be consumer friendly and require mobile, networking, AI, internet or cloud based answers.
	PSO4	Apprehend and apprehend superior programming level, facts structures, databases, networking, cell computing, safety of know-how, and information analysis.

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Details of Course Outcomes					
S. No	Semester	Course Name	Course Code	Course Outcomes	
1	1	Introduction to Information Technology	CSA551	CO1	Apply the knowledge of combinational and sequential logic circuits to mimic a simple architecture
				CO2	Answers about the social, economic, and political contexts in which it exists
				CO3	To introduce cutting-edge technologies and trends such as those in the areas of wireless multimedia, computer security, digital audio, and high-performance computing
				CO4	Apply the knowledge of combinational and sequential logic circuits to mimic a simple architecture.
2		Programming Language Concepts	CSA553	CO1	Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
				CO2	Understand dynamic memory management techniques using pointers, constructors, destructors, etc
				CO3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism
				CO4	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
3		Operating System & System Software	CSA555	CO1	Analyze the structure of OS and basic architectural components involved in OS design.
				CO2	Analyze and design the applications to run in parallel either using process or thread models of different OS.
				CO3	Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.
				CO4	Interpret the mechanisms adopted for file sharing in distributed Applications and conceptualize the components involved in designing a contemporary OS.
				CO1	Basic design and implementation of websites

4	1	Web Technology	CSA557	CO2	Client-side technologies including HTML5,CSS, JavaScript, ASP, and XML
5		Electronics in IT Communication	CSA563	CO1	Define basic logical circuits, Boolean algebra, minimization methods, methods for writing Boolean functions, combinational and sequential circuits
				CO2	Describe operation methods of combinational and sequential circuits
				CO3	Select appropriate methods for realization and circuit minimization.
				CO4	Synthesis of appropriate combinational and sequential logic circuits
6	2	Advanced Communication Skills	ENG507	CO1	To get in-depth knowledge of IT and its importance for the area of their expertise.
				CO2	To demonstrate the features and functions of major categories of applications software.
				CO3	To impart basic understanding of computer hardware and software with their application in commerce
7	2	Relational Database Management Systems	CSA552	CO1	Describe the basic concepts of the relational model and understand its mathematical foundation
				CO2	Use the SQL language to define, query and manipulate a relational database
				CO3	Apply conceptual database modeling methods such as entity-relationship model to design a relational database.
				CO4	Apply database design methods on functional dependencies and normal forms to evaluate the quality of a relational database design.
8		Data Communication and Computer Networks	CSA554	CO1	Use the seven layer model to classify networking buzzwords
				CO2	Build and troubleshoot Ethernet, LAN/WAN and WiFi networks
				CO3	Evaluate LAN and WAN technologies.
				CO4	Explain the difference between switches and routers and connect networks with routers

9		Computer Architecture	CSA556	CO1	Design basic and intermediate RISC pipelines, including the instruction set, data paths, and ways of dealing with pipeline hazards
				CO2	Consider various techniques of instruction-level parallelism, including superscalar execution, branch prediction, and speculation, in design of high-performance processors
				CO3	State and understand memory hierarchy design, memory access time formula, performance improvement techniques, and trade-offs.
				CO4	State and compare properties of shared memory and distributed multiprocessor systems and cache coherency protocols
10		Object Oriented Programming Structures using C++	CSA558	CO1	Introduces Object Oriented Programming concepts using the C++ language.
				CO2	Introduces the principles of data abstraction, inheritance and polymorphism
				CO3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism
				CO4	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
11		Natural Hazards and Disaster Management	EVS003	CO1	Knowledge about the natural calamities and their origin
				CO2	Risk Assessment of Natural hazards
				CO3	Disaster Management and effect of Climate change
12		Programming with Python	CSA501	CO1	Understand why Python is a useful scripting language for developers.
				CO2	Learn how to design and program Python applications
				CO3	Learn how to use lists, topples, and dictionaries in Python programs
				CO4	Learn how to identify Python object types
13		Data Structure and Algorithms	CSA651	CO1	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
				CO2	Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graph

				CO3	Demonstrate different methods for traversing trees
				CO4	Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing
14		Computer Graphics	CSA653	CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
				CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis
				CO3	Use of geometric transformations on graphics objects and their application in composite form
				CO4	Extract scene with different clipping methods and its transformation to graphics display device.
15		Gender Equity	SSC001	CO1	The students will analyze the evolution of thinking and approaches around gender and development.
16		Cloud Computing Concepts	CSA516	CO1	Understand the concepts, characteristics, delivery models and benefits of cloud computing
				CO2	Understand the different characteristics of public, private and hybrid cloud deployment models.
				CO3	Understand the key security and compliance challenges of cloud computing.
				CO4	Understand the key technical and organizational challenges
17		Software Quality Assurance	CSA659	CO1	Understand the basic tenets of software quality and quality factors.
				CO2	Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components
				CO3	Understand of how the SQA components can be integrated into the project life cycle.
				CO4	Be exposed to the management components of software quality
18		Digital Image Processing	CSA661	CO1	Explain the basic elements and applications of image processing and analyze image sampling and quantization requirements and implications
				CO2	Design and implement two-dimensional spatial and frequency filters for image enhancement

				CO3	Model the image restoration problem in both time and frequency domains and explain the image segmentation and image compression problem
				CO4	Implement basic image processing algorithms in MATLAB.
19		Simulation & Modeling using MATLAB	CSA665	CO1	Use MatLab for interactive computations.
				CO2	Familiar with memory and file management in MatLab.
				CO3	Generate plots and export this for use in reports and presentations.
				CO4	Program scripts and functions using the Mat lab development environment.
20		Natural Language Processing	CSA528	CO1	Understand approaches to syntax and semantics in NLP
				CO2	Understand approaches to discourse, generation, dialogue and summarization within NLP.
				CO3	Understand current methods for statistical approaches to machine translation
				CO4	Understand machine learning techniques used in NLP, including hidden Markov models and probabilistic.
21		IOT Architecture and protocols	CSA667	CO1	Comprehend the essentials of IoT and its applications
				CO2	Understand the concepts of IoT Architecture Reference model and IoT reference architecture
				CO3	Analyze various IoT Application layer Protocols
				CO4	Apply IP based protocols and Authentication Protocols for IoT
22		Computer and Information Security	CSA530	CO1	Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications
				CO2	Gain familiarity with prevalent network and distributed system attacks, defences against them, and forensics to investigate the aftermath.
				CO3	Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today
				CO4	Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges

23		JAVA	CSA652	CO1	Get knowledge of the structure and model of the Java programming language, (knowledge)
				CO2	Use the Java programming language for various programming technologies (understanding)
				CO3	Develop software in the Java programming language, (application)
				CO4	Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
24		PHP	CSA506	CO1	Analyze the construction of a web page and relate how PHP and HTML combine to produce the web page.
				CO2	Write regular expressions including modifiers, operators, and meta characters.
				CO3	Create PHP programs that use various PHP library functions, and that manipulate files and directories.
				CO4	Analyze and solve various database tasks using the PHP language.
25		Software Engineering& System Programming	CSA654	CO1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
				CO2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
				CO3	An ability to communicate effectively with a range of audiences
				CO4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
26		Human values& Professional Ethics	SSC006	CO1	Students will behave ethically and promote human values in society.
				CO2	Students will behave professionally
				CO3	Students will able to understand harmony in Human Relationship

27		Compiler Design	CSA660	CO1	Construct a parse tree, or explain why no parse tree exists, given a BNF grammar and a string over the appropriate alphabet.
				CO2	Implement a lexical analyzer from a specification of a language's lexical rules
				CO3	Translate a BNF grammar that uses "[ ]" notation and "{ }" notation into an equivalent grammar with no such notation.
				CO4	Compute the FIRST set for a BNF grammar
28		Network Operating System	CSA662	CO1	Discuss Green IT with its different dimensions and Strategies
				CO2	Describe Green devices and hardware along with its green software methodologies
				CO3	Discuss the various green enterprise activities, functions and their role with IT.
29		Artificial Neural Networks	CSA664	CO1	Know the main provisions neuro mathematics
				CO2	Know the main types of neural networks
				CO3	Know and apply the methods of training neural networks
				CO4	Know the application of artificial neural networks
30		Data Analysis using R-Tools	CSA666	CO1	List motivation for learning a programming language
				CO2	Access online resources for R and import new function packages into the R workspace
				CO3	Import, review, manipulate and summarize data-sets in R.
				CO4	Explore data-sets to create testable hypotheses and identify appropriate statistical tests
31		Image and Speech Recognition	CSA625	CO1	Fundamental concepts of a digital image processing system
				CO2	Concepts of image enhancement techniques
				CO3	Compression techniques and Morphological concepts
32		Privacy & Security in IOT	CSA668	CO1	Understand the concepts of Internet of Things
				CO2	Analyze basic protocols in wireless sensor network
				CO3	Design IoT applications in different domain and be able to analyze their performance
				CO4	Implement basic IoT applications on embedded platform
				CO1	Compare, contrast, and apply the key algorithmic design paradigms: brute force, divide and conquer, decrease and conquer, transform and conquer, greedy, dynamic

33		Network and Web Security	CSA670	CO2	Define, compare, analyze, and solve general algorithmic problem types: sorting, searching , string processing, graphs, and geometric
				CO3	Compare, contrast, and apply algorithmic tradeoffs: time vs. space, deterministic vs. randomized, and exact vs. approximate
				CO4	Compare, contrast, and apply key data structures: trees, lists, stacks, queues, hash tables and graph representations
34		Ruby Programming	CSA520	CO1	Program in Ruby
				CO2	Understand the Rails Framework
				CO3	Harness the speed and ease of developing a Rails application
				CO4	Create and use XML in Rails applications

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