



HOLY CROSS COLLEGE (AUTONOMOUS)

Affiliated to Bharathidasan University
Nationally Accredited(3rd Cycle) with 'A' Grade
NAAC College with Potential for Excellence.
Tiruchirappalli - 620002.

DEPARTMENT OF COMPUTER SCIENCE

Programme: B.C.A

PO No.	Programme Outcomes <i>Upon completion of the B.C.A Degree Programme, the graduate will be able to</i>
PO-1	Attain excellence in the area of Computer Applications
PO-2	Utilize the practical skill to examine, plan and engineer the applications of technology using computing tools and techniques
PO-3	Design innovative methodologies/techniques/ideas for solving real time problems to cater to the need for the society.
PO-4	Create student employability and be competent enough to work in IT industry.
PO-5	Integrate ethical values in designing computer application.

**Use words that show the outcomes will be fulfilled following the completion of the Programme*

PSO No.	Programme Specific Outcomes <i>Upon completion of these courses the student would</i>
PSO-1	Acquire advanced knowledge in various area of computer Applications
PSO-2	Analyze and find the best techniques for solving computational problem
PSO-3	Develop competent technical writing skills for software
PSO-4	Apply the recent technology in various domains and evaluate the methods of implementing it.
PSO-5	Design and Create innovative ideas that meet the requirements of software Industry

Course Title		Major Core 1: Foundations Of Programming	
Code		U18CA1MCT01/ U18CS1MCT01	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Know the correct and efficient ways of solving problems.	PSO 1, PSO 2	U
CO-2	Write C program for simple applications	PSO 2	An
CO-3	Formulate algorithm for simple problems	PSO 2	U
CO-4	Analyze different data types and arrays	PSO 5	An
CO-5	Perform simple search and sort	PSO 1	Ap
CO-6	Understand memory management and write programs using structures for solving complex computational problem	PSO 2, PSO 3	U
CO-7	Create files and perform file operations using C	PSO 1, PSO 5	R, An
CO-8	Apply the programming language concepts to solve real time problems	PSO 1, PSO 5	E

Course Title		Allied 1 (Compulsory): Business Information Systems	
Code		U18CA1ACT01	
CO No.	Course Outcomes	PSOs addressed	Cognitive Level
CO-1	Analyze and model the flow of information through business processes.	PSO 1	R, An
CO-2	Formulate plans and architectures for the capture, storage and retrieval of data.	PSO 2	U, Ap
CO-3	Develop computer programs to support or automate business processes.	PSO 3	Ap, C
CO-4	Apply networking concepts and technologies to support business needs.	PSO 4	Ap
CO-5	Align information systems and services with business strategy and formulate plans for the retrieval and analysis of supporting data.	PSO 5	An, Ap
CO-6	Document, monitor and assess the effectiveness of IT controls.	PSO 1	R, U, E
CO-7	Analyze the various concepts of information systems used in real time businesses.	PSO4	R,An

Course Title		Major Core 3: Data Structures And Algorithms	
Code		U18CA2MCT03 / U18CS2MCT03	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand array concept and develop array programs in C	PSO 2	U
CO-2	Appreciate the concept of memory allocation in C	PSO 2	An
CO-3	Analyze and implement linked list concept	PSO 2	An
CO-4	Illustrate the concept of Stack and Queue	PSO 5, PSO 1	An
CO-5	Appraise the concept of trees	PSO 1, PSO 3	E
CO-6	Manipulate operations on graphs	PSO 1	U
CO-7	Apply the data structures and algorithms to real-time problems.	PSO 4	Ap

Course Title		Major core 4 – Database Systems and Data Mining	
Code		U17CA3MCT04	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and Relate file management systems with DBMS.	PSO 1	R, U
CO-2	Design relations using Database Schema	PSO2 PSO5	A
CO-3	Relate Relational Algebra Notation with Relation Operation to access the data.	PSO 2	An
CO-4	Differentiate and Refine the relations by applying normalization techniques.	PSO 4	An,E
CO-5	Sketch and Relate E-R diagrams with relations.	PSO 2	An
CO-6	Apply SQL queries to access the data.	PSO 4	Ap
CO-7	Recognize the importance of Data Mining.	PSO 1	R, U
CO-8	Illustrate the classification, clustering and outlier detection of data.	PSO 2	U,E
CO-9	Design, develop and test a DBMS-backed web application to address a real time problem for maintaining the data in database.	PSO4	Ap

		Major core 6 – Java Programming	
Code		U17CA4MCT06	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	State OOPS and Relate java syntax with C and C++.	PSO 1	R, U
CO-2	Categorize OOPS such as encapsulation, abstraction, polymorphism.	PSO 2	An
CO-3	Applying encapsulation concepts in developing the programs with classes and objects.	PSO 4	Ap
CO-4	Identify different types of inheritance and apply them for reusability of code.	PSO1, PSO4	R, Ap
CO-5	Construct the packages by arranging the classes with visibility control.	PSO2, PSO5	C, An
CO-6	Develop program using different methods of thread creation and exception handling.	PSO 5	C, Ap
CO-7	Create Internet program using applets.	PSO 5	C,Ap
CO-8	Evaluate java collection with other implementation methods of data structure.	PSO 4	E
CO-9	Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem.	PSO 4	An

Course Title		Major Core 8 –Operating Systems	
Code		U17CA5MCT08/ U18CA5MCT09	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the different structures of operating systems.	PSO 1	R, U
CO-2	Discuss theory and implementation of processes,resource control, physical and virtual memory, scheduling, I/O and files	PSO 2	R
CO-3	Calculate waiting time, response time, turnaround time and disk seek time in disk scheduling	PSO 2	U
CO-4	Compare the memory allocation methods and differentiate the page replacement algorithms	PSO 3	An
CO-5	Conclude with a detailed understanding of Linuxkernel	PSO 4	An
CO-6	Gain the necessary knowledge for the employability in teaching profession.	PSO 3	U

Course Title		Major Core 7 – Computer Organization and Architecture	
Code		U17CA5MCT07	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the Computer Instructions	PSO 1	R, U
CO-2	Explain the Instruction Cycle.	PSO 2	U
CO-3	Illustrate the concept of Micro programmed Control	PSO 2	U
CO-4	Illustrate the concepts of transfer of data.	PSO 3	U
CO-5	Differentiate different types of addressing modes and explain pipeline and vector processing.	PSO 4	An
CO-6	Analyze the various types of Memory and the purpose of Memory Management.	PSO 4	An
CO-7	Acquire the knowledge of working principles of computer systems	PSO 2	Ap

Course Title		MAJOR CORE 9/ MAJOR CORE 10 COMPUTER NETWORKS	
Code		U17CA5MCT09 / U18CA5MCT10	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the fundamental knowledge in Network Hardware and Software; summarize OSI reference Model.	PSO 2	R, U
CO-2	Describe about the types of Transmission Media and understands the working of Public Switched Telephone Network.	PSO 2,6	R, An
CO-3	Relate and illustrate the techniques of Error Detection and Correction.	PSO 2	U, A
CO-4	Express the Elementary Data Link Protocols.	PSO 3	R
CO-5	Illustrate and analyse the Routing and Congestion Control Algorithms in Network Layer; explain the underlying protocol in Transport Layer.	PSO 4	R, An
CO-6	Identify the functionality of Application Layer services.	PSO 4	U
CO-7	Analyze and interpret the network security algorithms.	PSO 1,6	R, An
CO-8	Analyze the various concepts of networks related to OSI and TCP reference models	PSO 5	An

Course Title		MAJOR CORE 10 - OBJECT ORIENTED PROGRAMMING IN C# AND .NET PROGRAMMING	
Code		U17CA5MCT10	
CO No.	COURSE OUTCOMES	PSOs Addressed	Cognitive Level
CO-1	Realizes the .NET FRAMEWORK fundamentals	PSO - 1	R
CO-2	Comprehends the Windows controls used with C# Programming aspects	PSO - 2	U
CO-3	Explicates the Windows application development in .NET with C# programming	PSO - 3	R, U
CO-4	Applies and analyzes the GUI application development	PSO - 4	R, U
CO-5	Exemplifies the windows controls related with database objects	PSO - 5	Ap, An
CO-6	Apply the .NET concepts to develop applications for real timeproblems	PSO-4	Ap

Course Title		SKILL BASED ELECTIVE 4 QUANTITATIVE APTITUDE	
Code		U15CA5SBT04	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the body of rules surrounding English grammar in every day context including the use of noun, tense and articles.	PSO 1, 3	R, U
CO-2	Demonstrate various principles involves in solving mathematical problem and thereby reducing the time taken for solving role.	PSO 2, 4	R, An, Ap
CO-3	Define and describe several examples of verbal reasoning problem.	PSO 2, 4, 5	U, An, Ap
CO-4	Illustrate the use series of techniques and analogies.	PSO 3,4	R, Ap
CO-5	Solve the various problem and solution in puzzles concepts	PSO 4, 5	R, An, Ap
CO-6	Develop the skills to apply for competitive exams.	PSO 5	Ap

Course Title		MAJOR CORE 12 – SOFTWARE ENGINEERING CONCEPTS	
Code		U17CA6MCT12	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Define software, explain the nature of software , software process and software engineering practice, explain and compare the various models.	PSO 2	R, U
CO-2	Discuss the requirements, analyze and design the various requirement models.	PSO 2,6	R, U
CO-3	Explain the design concepts, analyze and apply the concepts to design architectural, component level & User interface models, list the golden rules.	PSO 2	U
CO-4	Explain the quality concepts, Software Quality Assurance tasks, discuss the strategies of testing, explain the types of testing.	PSO 3	Ap
CO-5	Explain the Product, process & project metrics, discuss the estimation modeling, understand the emerging trends, Prepare a Product.	PSO 4	U
CO-6	Analyze and Apply the concepts of Software Development Life Cycle to do real time projects	PSO 4,5	An, Ap

Course Title		MAJOR CORE 13 – COMPUTER GRAPHICS		
Code		U17CA6MCT13		
CO No.	COURSE OUTCOMES	PSOs Addressed	Cognitive Level	
CO-1	Acquire the concept of Raster Scan & Random Scan System Architectures with relevant equations of computer graphics	PSO - 1	R	
CO-2	Understood and analyze the basic graphics algorithms for drawing and clipping the geometric objects.	PSO - 2	U	
CO-3	Able to recognize the coordinate elements to display graphic images to given specifications	PSO - 3	R, U	
CO-4	Describes the standard graphic projections of lines, planes and solids	PSO - 4	R, U	
CO-5	Obtain development of surfaces and filling attributes with geometric object with various projections	PSO - 5	Ap, An	
CO-6	Classifies the 2D and 3D views and coordinate systems with graphical techniques to improve the skill of graphical designing	PSO - 5	An, Ev	

Course Title		Major Elective 3– Internet of Things	
Course Title		Major Elective 3– Business Process Outsourcing	
Code		U17CA6MCT14	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and relate the concept of outsourcing and identify different types of outsourcing.	PSO 1	R, U
CO-2	Identify BPO Companies in India and world-wide.	PSO 2	R
CO-3	Evaluate the call centers and appreciate the use of BPOs in Healthcaresystems.	PSO 5	Ap
CO-4	Examine Transaction Processing BPO and HumanResource BPO	PSO 4	E
CO-5	Plan for Career Opportunities in the BPO Industry.	PSO 3	An
CO-6	the Offshore BPO	PSO 4	E

Code		U18CA6MET07	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recognize and describe the Internet of computer and Internet of Things	PSO 1	R, U
CO-2	Classify IoT architecture based on their applicability.	PSO 2	An
CO-3	Identify the different protocols used in different layer.	PSO 2	R
CO-4	Classify models in IoT Architecture and relate it with real time implementation	PSO2, PSO3	An
CO-5	Implement Python Program in Raspberry PI board using python.	PSO4 PSO5	Ap
CO-6	Express the IoT application in various real time problems	PSO 4	U

Course Title		Major Elective 3 – Cloud Computing	
Code		U18CA6MET08	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the fundamental concepts in cloud.	PSO 1	R, U
CO-2	Analyse the cloud enabling technologies.	PSO 4	U
CO-3	Know and explain the Virtualization mechanisms.	PSO 4	U
CO-4	Comprehend the Cloud Data Security concepts.	PSO 2	R
CO-5	Know and distinguish the various applications Cloud.	PSO 2	An
CO-6	Analyze the concepts of Cloud Computing to develop the skill of doing research	PSO 4	An

Course Title		MAJOR ELECTIVE 3 – BIG DATA ANALYTICS	
Code		U18CA6MET09	
CO No.	COURSE OUTCOMES	PSOs Addressed	Cognitive Level
CO-1	Explain the fundamentals of Big Data and categorizes Big Data and its importance	PSO - 1	R
CO-2	Identify the distributed Computing with Big Data and the various layers of the Stack	PSO - 2	U
CO-3	Describe the virtualization approaches and models with cloud environment in big data	PSO - 3	R, U
CO-4	Explore the various operational databases and technologies like Hadoop & MapReduce	PSO - 4	R, U
CO-5	Summarize the big data analytics in various environments	PSO - 5	Ap, An
CO-6	Integrate the Text data analytics with Customized approaches	PSO - 5	Ap, An

Course Title		ALLIED OPTIONAL 3 COMPUTER APPLICATION IN BUSINESS (THEORY CUM LAB)	
Code		U18CA2AOT03	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the Components, different Applications and issues of Information Technology.	PSO 1	R, U
CO-2	Discuss the terminologies of Operating System and features of Microsoft Word.	PSO 1, 2	R, Ap
CO-3	Explain the features of Excel Environment.	PSO 1, 4, 5	U, Ap, E
CO-4	Create Power Point Presentation with Multimedia Effects.	PSO 3, 5	R,Ap
CO-5	Relate Ecommerce Framework with Real-Time Applications.	PSO 4,5	R, Ap
CO-6	Apply the concepts of Ecommerce to solve real-time problems.	PSO 5	Ap

Course Title		Major Core 13 – Digital Marketing(Theory cum Lab)	
Code		U18CA6MCT17	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the basics of digital marketing and its process.	PSO 1	R, U
CO-2	Distinguish various pay per clicks and digital display ads.	PSO 2	R
CO-3	Discuss about email marketing and mobile marketing.	PSO 2	U
CO-4	Discuss about social media marketing.	PSO 3	R
CO-5	Illustrate strategy and planning of digital marketing.	PSO 4	An

Course Title		Major Elective 3 –E-Commerce	
Code		U18CA6MET06	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe and criticize the e-commerce, advantage disadvantage of E-commerce and traditional Commerce v/s E-Commerce .	PSO 1	R, U
CO-2	Explain different type of models and activities of E- Commerce.	PSO 2	U
CO-3	Describe the different type techniques and software used in E-Commerce.	PSO 2	U
CO-4	Identify the strategies for marketing sales and promotion.	PSO 3	An
CO-5	Describe and show the different type of E-Commerce application and Supply Chain diagram.	PSO 4	U
CO-6	Analyze the concepts of E-commerce for skill development towards solving real-time problems.	PSO -3	An

MASTER OF COMPUTER APPLICATIONS

PO No	Programme Outcomes <i>Upon completion of the M.C.A. Degree Programme, the graduate will be able to</i>
PO-1	Acquire the abilities in Computing, Aptitude and Accounts to find novel solutions for the complex problems in IT field.
PO-2	Acquire the knowledge to understand and analyse the problem, design a paradigm and to develop a software product to cater the needs of Industry and Society
PO-3	Instill the confidence in students for self learning to update the current trends in IT to become an efficient Professionals
PO-4	Understand the Code of Ethics and Standards of the computer Professionals and develop the young minds with Social responsibilities and commitments
PO-5	Apply the Management principles and skills to develop a software product as a team member and effectively manage the team as well as the product

PSO No.	Programme Specific Outcomes <i>Upon completion of these courses the student would</i>
PSO-1	Acquire academic excellence with an aptitude for higher studies and research
PSO-2	Understand the concepts of programming, computation and management and apply them in the field of Computer Science
PSO-3	Apply the skills gained to analyse, design and to develop effective software product
PSO-4	Understand the recent technologies and tools to provide innovative ideas and solutions to the existing problems.
PSO-5	Apply the managerial skills in working environment to work effectively with other team members
PSO-6	Apply the appropriate Software Engineering practices to deliver a Quality products catering to the needs of Industry and Society at a large.

Course Title	Major Core 1- Computer Organization And Architecture		
Code	P18CA1MCT01		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and relate the various number systems.	PSO 1	R, U
CO-2	Explain the Sequential Circuits and Combinational Circuits.	PSO 2	A
CO-3	Illustrate the concepts of instruction cycle, instruction code and I/O interrupts.	PSO 2	U
CO-4	Differentiate different types of addressing modes.	PSO 3	Ap
CO-5	Summarize on memory organization.	PSO 4	An
CO-6	Acquire the knowledge of working principles of computer systems	PSO 2	Ap

Course Title	Major Core 2- Problem Solving And Programming		
Code	P18CA1MCT02		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand and design a computational solution for a given problem.	PSO 1	U
CO-2	Analyze the flow of the program and various stages in program execution.	PSO 2	An
CO-3	Learn the basics of C and the programming constructs.	PSO 2	U
CO-4	Apply structures, strings, arrays, pointer and files for solving complex computational problem.	PSO 3	Ap
CO-5	Implement the User defined functions and files in real time Problems.	PSO 4	Ap
CO-6	Able to develop software for solving mathematical and real time problems	PSO 4	

Course Title		Major core4 – Data Structures And Algorithms	
Code		P18CA1MCT04	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the fundamentals of Data Structures and basic concepts of String Processing, Linear Arrays, Records and Pointers.	PSO 1	U
CO-2	Analyze the representation of Linked Lists in memory, Stack, Queues and implement real time applications in Stack and Queues.	PSO 2	An
CO-3	Explore the structure of Trees, basic operations of Trees, analyze and illustrate the algorithms.	PSO 2	U
CO-4	Apply data structures and algorithms in real time applications.	PSO 3	Ap
CO-5	Analyze the various algorithm design and implementation.	PSO 4	Ap
CO -6	Develop solutions using advanced algorithms for various kinds of problems.	PSO 3	Ap

Course Title		Major core 8 – Operating Systems	
Code		P18CA2MCT08	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	List and Recognize the various types of operating system.	PSO 1	R, U
CO-2	Explain, Discuss, Compare and Contrast the various scheduling algorithms	PSO 2	Ap
CO-3	Describe, Compute and choose the correct scheduling algorithm for the given problem	PSO 2	E
CO-4	Explain the Deadlock concepts and Memory Management Techniques	PSO 3	R, U
CO-5	Discuss the concepts of file systems and mass storage structure, explain the different allocation methods, compare	PSO 4	R, Ap
CO – 6	Acquire the knowledge of operating system software	PSO 1	U

Course Title		Semester II – Object Oriented Programming With Java	
Code		P18CA2MCT09	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the principles of object – oriented programming.	PSO 1	R, U
CO-2	Apply the concepts of data encapsulation, inheritance, and polymorphism to large– scale software.	PSO 2	Ap
CO-3	Investigate the concepts of Graphical User Interfaces.	PSO 2	U
CO-4	Test and Formulate problems as steps so as to be solved systematically.	PSO 3	U
CO-5	Develop java applications for problems in current scenario.	PSO 3	Ap
CO-6	Apply the programming concepts of Java to solve real time problems.	PSO 4	Ap

Course Title		Major core 11 – Computer Networks And Network Security	
Code		P18CA2MCT11/ P17CA3MCT18	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	To educate concepts, vocabulary and techniques currently used in the area of computer networks.	PSO 1	R, U
CO-2	To study protocols, network standards, the OSI model, cabling, networking components, and basic LAN design.	PSO 2	R
CO-3	To accumulate existing state of the art in network protocols, architectures, and applications.	PSO 2	U
CO-4	To be familiar with contemporary issues in networking technologies.	PSO 3, 4	U
CO-5	Explain the fundamentals of network security.	PSO 4	R
CO-6	Learn the encryption and digital signature techniques.	PSO 3,4	An , Ap
CO-7	Illustrate various encryption techniques with applications involved.	PSO 4,5	An, Ap
CO-8	Develop enhanced network security algorithms	PSO 1	U,Ap
CO-9	Analyze the various concepts of networks related to OSI and TCP reference models	PSO 5	An

Course Title		Major core 12 – Management Information Systems	
Code		P18CA2MCT12	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Evaluate the role of information systems in today's competitive business environment.	PSO 1	R, U
CO-2	Identify and describe important features of organizations in order to build and use information systems successfully.	PSO 2	Ap
CO-3	Demonstrate systems analysis, design and decision making in a business setting.	PSO 2	U
CO-4	Define and describe the fundamentals of hardware, software, database management, data communications and systems related to the management activities of an organization.	PSO 3	U
CO-5	Assess how information systems support the activities of managers and end – users in organizations.	PSO 4	Ap
CO -6	Develop skills for business management	PSO 3	U,Ap

Course Title		Major Core 16 – J2EE and Python Programming	
Code		P18CA3MCT16	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and relate the various technologies with multi tier in J2EE architecture.	PSO 2	R
CO-2	Identify various driver and Objects used in JDBC connection with database.	PSO 2	R
CO-3	Design and implement Java servlet program using HTTP protocol.	PSO 3	C,Ap
CO-4	Apply JSP tags and create Web application software for real time problems	PSO3 PSO 6	Ap
CO-5	Design and construct business software using various types of beans in EJB.	PSO2 PSO4	C,Ap
CO-6	Construct Python programming for validation of user data.	PSO2 PSO 3	C,Ap
CO-7	Develop advanced java programs for creating web	PSO 3	Ap

Course Title		Major core 17 – Database Management Systems	
Code		P18CA3MCT17	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the basic concepts of database system and fundamental relational algebraic operations.	PSO 1	R, U
CO-2	Explain, Apply SQL queries, Create ER model for any database applications.	PSO 2	Ap
CO-3	Explain the normalization techniques; learn the basic idea of object – based database.	PSO 2	U
CO-4	Describe the physical storage media and file structure, compare the file organization techniques; understand, analyze & compare Indexing & Hashing techniques.	PSO 3	U, Ap
CO-5	Discuss the concepts of Transaction and Concurrency control, classify the database system architecture, Understand and apply NOSQL queries	PSO 4	U, Ap
CO-6	Acquire the knowledge of working with database	PSO 2	U

Course Title		Major core 18 – Business Intelligence	
Code		P18CA3MCT18	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the fundamentals of business intelligence.	PSO 1	R, U
CO-2	Link data mining with business intelligence.	PSO 2	Ap
CO-3	Apply various modeling techniques.	PSO 2	U
CO-4	Explain the data analysis and knowledge delivery stages.	PSO 3	U
CO-5	Apply business intelligence methods to various situations.	PSO 4	Ap
CO-6	Develop effective business solutions using advanced technologies	PSO 3	Ap,U

Course Title		Major Elective 1 - Adhoc And Sensor Networks		
Code		P18CA3MET01		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level	
CO-1	To understand the basics of AdHoc& Sensor Networks.	PSO 1	R, U	
CO-2	To learn various fundamental and emerging protocols of all layers in AdHoc Network.	PSO 2	Ap	
CO-3	To study about the issues pertaining to major obstacles in establishment and efficient management of AdHoc and Sensor Networks.	PSO 2	U	
CO-4	To understand the nature and applications of AdHoc and Sensor Networks.	PSO 3	U	
CO-5	To understand various security practices and protocols of AdHoc and Sensor Networks.	PSO 4	Ap	
CO -6	Build sensor networks in various fields.	PSO 4	U,Ap	

Course Title		Major Elective 1 - Principles Of Data Science		
Code		P18CA3MET02		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level	
CO-1	Explore the fundamental concepts of data science.	PSO 1	R, U	
CO-2	Discuss data analysis techniques for various applications.	PSO 2	Ap	
CO-3	Explain various algorithms used in data science.	PSO 2	U	
CO-4	Analyse the difference between various database systems with NOSQL.	PSO 3	U	
CO-5	Create an interactive dashboard.	PSO 4	Ap	

Course Title		Major Elective 1 - Cloud Computing	
Code		P18CA3MET03	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the fundamental concepts in cloud.	PSO 1	R, U
CO-2	Analyze the cloud enabling technologies.	PSO 2	Ap
CO-3	Know and explain the Infrastructure oriented mechanisms.	PSO 2	U
CO-4	Comprehend the Cloud security mechanisms and	PSO 3	U
CO-5	know and distinguish the delivery models from provider and consumer perspective.	PSO 4	Ap
CO-6	Develop secure cloud based applications	PSO 3	Ap

Course Title		Major Core 21 – SIMULATION AND MODELING	
Code		P18CA4MCT21	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the various types of Tests.	PSO 1	R, U
CO-2	Discuss the statistical models.	PSO 2	R,U
CO-3	Explain the different random variate generation methods.	PSO 2	U
CO-4	Apply the blocks of GPSS to simulate various real time systems.	PSO 3	Ap
CO-5	Discuss the concept of SIMSCRIPT language with applications.	PSO 4	U
CO-6	Prepare models using GPSS and SIMSCRIPT programs	PSO 4	Ap

Course Title		Major Core 22 – Dot net Technologies	
Code		P18CA4MCT22	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain Architecture & features of DOTNET Framework and VS 2012 IDE.	PSO 1	U
CO-2	Discuss Object Oriented Programming concepts in C# programming.	PSO 2	R, Ap
CO-3	Explain WPF Class Hierarchy with Application model with relevant to Flow control mechanisms.	PSO 2	U
CO-4	Database connectivity in WPF and ASP.NET applications.	PSO 3	Ap
CO-5	Classifies the Web standard controls and Validation controls of DOTNET Technology.	PSO 4	U, Ap
CO-6	Develop user-friendly applications using dot net	PSO 3	Ap

Course Title		Major Core 23 – Organizational Behaviour	
Code		P18CA4MCT23	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recognize, Explain the concept of Organization, Background and Foundation of Organizational Behavior.	PSO 2	R, U
CO-2	Explain the models of Man, Personality and learning; analyze the behavior of individuals and groups in organizations.	PSO 1,4	U, Ap
CO-3	Discuss the concepts of Attitude, Motivation & Work stress, apply Stress Management in the Personallife.	PSO 2	U, Ap
CO-4	Describe, Analyse the concepts of Interpersonal behavior, Explain group dynamics & group decision making, compare the different leadership styles and apply them in life situation.	PSO 4	An
CO-5	Explain the Organization theory; Compare the various organization structures, Differentiate centralization & decentralization.	PSO 3	An
CO-6	Develop good personality as an effective employee in an organization	PSO 3	Ap

Course Title		Major Core 24 –Open Source Server Side Scripting Tools	
Code		P18CA4MCT24	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Learn the various types of Linux Commands.	PSO 2	R, U
CO-2	learn and write the simple programs using PHP.	PSO 1,4	U, Ap
CO-3	know and explain the connecting the database with PHP coding.	PSO 2	U, Ap
CO-4	learn and explain the concepts of Ruby on Rails language.	PSO 4	An
CO-5	know and distinguish the concepts between Perl and Ruby on Rails.	PSO 3	An
CO-6	Develop open source software for real time problems	PSO 3	Ap

Course Title		Major Elective 2 - Cyber Crime And Digital Forensics		
Code		P18CA4MET04		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level	
CO-1	Understand the nature and categories of various Cyber Crimes.	PSO 1	R, U	
CO-2	Analyze the various Cyber threats and defensive techniques.	PSO 2	R,U	
CO-3	Discover the different Cyber Security Techniques.	PSO 2	U	
CO-4	Explore the Intrusion Detection Techniques in Cyber Crime.	PSO 3	Ap	
CO-5	Investigate the various Crimes in Cyber Field.	PSO 4	U	
CO-6	Aware of cyber crimes and develop effective solutions for different types of cyber crimes.	PSO 3	U, Ap	

Course Title		Major Elective 2 - Data Mining And Warehousing		
Code		P18CA4MET05		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level	
CO-1	Realize the basic terminologies of Data mining principles and techniques	PSO 1	R, U	
CO-2	Preprocess the data by using various Techniques and algorithms	PSO 2	R,U	
CO-3	Understand the Data warehousing Models and Architecture	PSO 2	U	
CO-4	Analyzes the various algorithms in Data Mining	PSO 3	Ap	
CO-5	Identifies different applications involved in Data Mining	PSO 4	U	
CO-6	As a Data analyst can analyse the present data and predict the future events of various fields.	PSO 4	Ap	

Course Title		Major Elective 2 – Fog Computing	
Code		P18CA4MET06	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the fundamental concepts in Fog.	PSO 1	R, U
CO-2	Analyze the architectures available in Fog.	PSO 2	R,U
CO-3	Know and explain the Protocols related to Fog.	PSO 2	U
CO-4	Comprehend the Data Management and Security Principles.	PSO 3	Ap
CO-5	Examine the case studies of Fog.	PSO 4	U
CO-6	Acquire the knowledge of fog computing and use of IoT in fog computing	PSO 1	R, U

Course Title		Professional Ethics	
Code		P17CA4SST01	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	examine situations and to internalize the need for applying ethical principles, values to tackle with various situations.	PSO 1	R, U
CO-2	develop a responsible attitude towards the use of computer as well as the technology.	PSO 2	R,U
CO-3	able to envision the societal impact on the products/ projects they develop in their career.	PSO 2	U
CO-4	understanding the code of ethics and standards of computer professionals.	PSO 3	Ap
CO-5	analyze the professional responsibility and empowering access to information in the workplace.	PSO 4	U
CO-6	Become ethically responsible IT professional	PSO 5	Ap

Course Title		Major Core27- Software Engineering	
Code		P18CA5MCT27	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Define software, explain the nature of software, software process and software engineering practice, explain and compare the various models.	PSO 1	R, U
CO-2	Discuss the requirements, analyze and design the various requirement models.	PSO 2	R,U
CO-3	Explain the design concepts, analyze and apply the concepts to design architectural, component level & User interface models, list the goldenrules.	PSO 2	U
CO-4	Explain the quality concepts, Software Quality Assurance tasks, discuss the strategies of testing, explain the types of testing.	PSO 3	Ap
CO-5	Explain the Product, process & project metrics, discuss the estimation modeling, understand the emerging trends, Prepare a Product	PSO 4	U
CO-6	Become efficient software developer	PSO 5	Ap

Course Title		Major Core28 -Principles Of Compiler Design	
Code		P18CA5MCT28	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the concepts of compiler and discuss the lexical analysis	PSO 1	U
CO-2	Describe the functionality of Lexical and Syntax analysis	PSO 1	U
CO-3	Illustrate the concepts of parser and its types	PSO 1	U
CO-4	Define the storage organization and List the intermediate codes.	PSO 4	U
CO-5	Summarize the working features of Code Generation.	PSO 4	U
CO-6	Acquire the knowledge of compiler develop a new compiler software	PSO 4	U, Ap

Course Title		Major Elective 3-Internet Of Things	
Code		P18CA5MET07	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and compare Internet of computer with Internet of Things.	PSO 2	R, U
CO-2	Identify the application of wireless technologies in various applications.	PSO 2	R
CO-3	Analyze different protocols in various IoT Layer.	PSO 3	An
CO-4	Differentiate IoT from Machine to Machine communication.	PSO 3	An
CO-5	Design and demonstrate IoT Applications using Python in Raspberry Pi.	PSO3 PSO4	Ap
CO-6	Identify different simulators used in various applications of IoT	PSO 4	U
CO-7	Create a solution for existing real time problem in various domain	PSO1 PSO6	C,Ap
CO-8	Develop smart systems and environment using IoT technology.	PSO 4	Ap

Course Title		Major Elective 3- Big Data Analytics	
Code		P18CA5MET08	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explains the fundamentals and categorize and summarize Big Data and its importance.	PSO 1	R, U
CO-2	Identifies the usage of big data analytics and its applications	PSO 2	R,U
CO-3	Summarizes operational issues of big data in various environments	PSO 2	U
CO-4	Differentiate various Big data technologies like Hadoop MapReduce	PSO 3	Ap
CO-5	Distinguish various big data analytic systems and apply tools and techniques to analyze Big Data.	PSO 4	U
CO-6	Use advanced big data technologies for handling massive volume of data	PSO 5	Ap

Course Title		Major Elective 3-Mobile Application Development	
Code		P18CA5MET09	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the importance and need of android OS.	PSO 1	R, U
CO-2	List and Recognize Android Development tools.	PSO 2	R,U
CO-3	Interpret Android Lifecycle in programs.	PSO 2	U
CO-4	Design UI with different layouts and fragments.	PSO 3	Ap
CO-5	Compare and Construct foreground and background applications with intents	PSO 4	U
CO-6	Develop applications with database and map concepts.	PSO 3	Ap
CO-7	Become Android developers	PSO 4	Ap

Course Title		Major Core 29 - Multi Platform Application Development	
Code		P18CA5MCT29	
CO No.	Course Outcomes	PSOs	Cognitive
		Addressed	Level
CO-1	Recognize and install Xamrin Development environment.	PSO 1	R, U
CO-2	Recall labels and views to construct UI Design	PSO 2	R,U
CO-3	Recall layouts to construct UI Design	PSO 2	U
CO-4	Develop UI Design from custom controls	PSO 3	Ap
CO-5	Create Xamarin mobile application with listview using adapters.	PSO 4	C
CO-6	Evaluate Different navigation patters and use them in applications.	PSO 4	E,Ap
CO-7	Develop xamarin programs with SQLite database.	PSO 4	C
CO-8	Analyze and build xamarin programs with different custom renderers.	PSO 4	An, Ap
CO-9	Develop smart applications than can be run on different mobile operating systems.	PSO 3	Ap

Course Title		Major Elective 4 –Body Sensor Networks	
Code		P18CA5MET10	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the fundamentals of Body Sensor Networks and its standards.	PSO 1	R, U
CO-2	Paraphrase and analyze the approaches of Signal Processing and Task Oriented Programming in Body Sensor Network Programming.	PSO 2	R,U
CO-3	Analyze the Autonomic Body Sensor Network and the Agent Oriented Body Sensor Network.	PSO 2	U
CO-4	Comprehends and manipulate the collaboration of Body Sensor Network and integrate the Body Sensor Network by building the Network.	PSO 3	Ap
CO-5	Develop the Body Sensor Network with SPINE based Body Sensor Network Applications.	PSO 4	U
CO-6	Create a body sensor network	PSO 4	Ap

Course Title		Major Elective 4 – HEALTH CARE INFORMATICS	
Code		P18CA5MET11	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss various Health Care data and applications.	PSO 1	R, U
CO-2	Describe the working of Health Information Exchange.	PSO 2	A
CO-3	Summarize the privacy and security aspect in Medical informatics.	PSO 2	U
CO-4	Express various mobile technologies interrelate with Telemedicine.	PSO 3	Ap
CO-5	Investigate the purpose of Telemedicine with pros and	PSO 4	An
CO-6	Acquire the knowledge of advanced technologies used in Health care systems	PSO 2	U

Course Title		Major Elective 4 – Green Computing	
Code		P18CA5MET12	
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the Concept of Green IT.	PSO 1	R, U
CO-2	Discuss Green IT in relation to technology.	PSO 2	A
CO-3	Evaluate IT use in relation to environmental perspectives.	PSO 2	U
CO-4	Discuss the methods and tools to measure energy consumption.	PSO 3	Ap
CO-5	Conclude with a Green IT to sustainable development	PSO 4	An
CO-6	Develop energy-saving, sustainable software solutions	PSO 3	Ap