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

DEPARTMENT OF COMPUTER SCIENCE
Programme: B.Sc. Computer Science

PO No.	ProgrammeOutcomes *Upon completion of the B.Sc. Degree Programme, the graduate will be able to*
PO-1	Understand the basic and advanced concepts of computer science research and career growth.
PO-2	Acquire analytical, creative and problem solving practical skills to meet the industry standards.
PO-3	Apply knowledge of computing principles to solve real time problems.
PO-4	Equip themselves with Empowered professional and ethical attitude and communicate effectively and work as a team.
PO-5	Implement independent projects of their own choice using latest tools.

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

PSO No.	Programme Specific Outcomes *Upon completion of these courses the student would*
PSO-1	quire academic excellence with professional skill for higher studies and research.
PSO-2	Achieve greater heights in various sectors of IT Industrythrough analytical design and implementation skills.
PSO-3	Identify and apply computing practices to succeed as an employee or an entrepreneurial pursuit.
PSO-4	Be ethically and professionally responsible with the ability to relatecomputer applications to broader social context for the growth of the nation.
PSO-5	eate, select and apply modern tools and techniques to analyze and develop a successful software sy stem.

*The (Intended) Programme Outcomes and the Programme Specific
Outcomes should comebefore the first paper of the first semester only

Course Title	MAJOR CORE 1: FOUNDATIONS OF PROGRAMMING		
Code	**U18CS1MCT01**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Know the correct and efficient ways of solving problems.	PSO1, PSO2	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	PSO2, PSO3	U
CO-7	Create files and perform file operations using C	PSO 1, PSO5	R, An
CO-8	Use programming language to solve problems	PSO1, PSO5	E

Course Title	ALLIED-1(COMPULSORY) – PRINCIPLES OF DIGITAL COMPUTERS		
Code	**U18CS1ACT01**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Explain the basic concepts of digital principles.	PSO 3	R, U
CO-2	Differentiate various number systems.	PSO 1	R
CO-3	Discuss various arithmetic and logical operations.	PSO 3	U
CO-4	Write assembly language programs using various instructions.	PSO 5	R, C
CO-5	Explain various logical instructions.	PSO 3	An

Course Title	MAJOR CORE 3: DATA STRUCTURES AND ALGORITHMS		
Code	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, PSO1	An
CO-5	Appraise the concept of trees	PSO 1.PSO 3	E
CO-6	Manipulate operations on graphs	PSO 1	U

Course Title	MAJOR CORE 4 – DATABASE SYSTEMS AND DATA MINING		
Code	U18CS3MCT05		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and Relate file management systems with DBMS	PSO 1	R
CO-2	Design relations using Database Schema	PSO 4	Ap
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 3	An
CO-5	Sketch and Relate E-R diagrams with relations	PSO 4	An
CO-6	Apply SQL queries to access the data	PSO 3	C
CO-7	Recognize the importance of Data Mining	PSO 3	U
CO-8	Illustrate the classification, clustering and outlier detection of data	PSO 4	E

Course Title	MAJOR CORE 7 – OPERATING SYSTEMS		
Code	**U18CS4MCT07**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Recall the different structures of operating systems	PSO 1	R
CO-2	Discuss theory and implementation of processes, resource control, physical and virtual memory, scheduling, I/O and files	PSO 2	Ap
CO-3	Calculate waiting time, response time, turnaround time and disk seek time in disk scheduling	PSO 2	Ap
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	U

Course Title	MAJOR CORE 8: OBJECT ORIENTED PROGRAMMING		
Code	U18CS5MCT08		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	State OOPS and Relate java syntax with c and C++.	PSO 3	R, U
CO-2	Categorize OOPS such as encapsulation, abstraction, polymorphism.	PSO 1	R
CO-3	Apply encapsulation concepts in developing the programs with classes and objects.	PSO 5	Ap
CO-4	Identify different types of inheritance and apply them for reusability of code.	PSO 2	Ap
CO-5	Construct the packages by arranging the classes with visibility control.	PSO 1	Ap
CO-6	Design program using different methods of thread creation and exception handling.	PSO 1	U
CO-7	Create Internet program using applets.	PSO 4	An
CO-8	Evaluate java collection with other implementation methods of data structure.	PSO 1	U,R

Course Title	MAJOR CORE 9 – SOFTWARE ENGINEERING CONCEPTS		
Code	U18CS5MCT09		
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

Course Title	Major Core 10 – Computer Organization and Architecture		
Code	U18CS5MCT10		
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	Ilustrate 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	Apply Basic Knowledge on Various Building Blocks of a Digital Computer and Architecture	PSO 4	R,U

Course Title	MAJOR ELECTIVE 2 – BIGDATA TECHNOLOGIES AND TOOLS		
Code	U18CS5MET04		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Summarize the basics of Big Data Analytics	PSO 1	R, U
CO-2	Distinguish various Big Data Analytic Systems	PSO 1 & PSO 2	R
CO-3	Compare various components of Hadoop Framework	PSO 2	U
CO-4	Categorize the NoSQL databases	PSO 2	U
CO-5	Discuss Real Time Analytics Framework	PSO 1 & PSO 2	An
CO-6	Evaluate Real Time Analytics and Streaming Analytics	PSO 3	U, An

Course Title	MAJOR ELECTIVE 2 – BUSINESS PROCESS OUTSOURCING		
Total Hours	60		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and relate the concept of outsourcing and identify different types of outsourcing.	PSO 4	R, U
CO-2	Explain BPO Companied in India and world-wide.	PSO 2	R
CO-3	Apply call centers and appreciate the use of BPOs in Healthcare systems.	PSO 3	Ap
CO-4	Examine Transaction Processing BPO and Human Resource BPO.	PSO 3	R
CO-5	Plan for Career Opportunities in the BPO Industry.	PSO 1	R
CO-6	Evaluate the Offshore BPO.	PSO 2	E

Course Title	MAJOR ELECTIVE 2: INTRODUCTION TO CLOUD COMPUTING		
Code	U18CS5MET06		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the various basic concepts related to cloud computing technologies	PSO 5	E, U
CO-2	Know and explain the Infrastructure oriented mechanisms.	PSO 2	U
CO-3	Explain the fundamental cloud architectures	PSO 2	U
CO-4	Explain the architecture and concept of different cloud models: IaaS, PaaS, SaaS	PSO 1	An
CO-5	Explain major security and privacy problems in the cloud and how they are addressed with the security mechanisms.	PSO 5	An

Course Title	SKILL BASED ELECTIVE 4: COMPETITIVE EXAMINATION SKILLS		
Code	U15CS5SBT04		
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	R, U
CO-2	Demonstrate various principles involves in solving mathematical problem and thereby reducing the time taken for performing job function.	PSO 5	R, A
CO-3	Define and describe several examples of verbal reasoning problem.	PSO 1	U
CO-4	Demonstrate the use of series of techniques and analogies.	PSO 1	R, A
CO-5	Solve the various problem and solution in puzzles concepts.	PSO 3	A

Course Title	MAJOR CORE 12 - COMPUTER NETWORKS		
Code	U18CS6MCT12		
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 Mediaand understands the working of Public Switched Telephone Network and Mobile TelephoneSystem.	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 Conge stion 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

Course Title	MAJOR CORE 14 – COMPUTER GRAPHICS		
Code	**U18CS6MCT14**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Associate the computer graphics display technologies and various input devices.	PSO 4	U
CO-2	Illustrate line drawing and circle generating algorithms.	PSO 2	A
CO-3	Discuss various attributes of output primitives.	PSO 5	U
CO-4	Illustrate and relate 2D geometric transformations and clipping techniques.	PSO 2	A
CO-5	Explain the concepts of 3D.	PSO 3	R, U
CO-6	Explain the concepts of 2D Viewing.	PSO 3	R, U

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-620 002.
DEPARTMENT OF COMPUTER SCIENCE
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PO No.	ProgrammeOutcomes *Upon completion of the B.Sc. Degree Programme, the graduate will be able to*
PO-1	Understand the basic and advanced concepts of computer science research and career growth.
PO-2	Acquire analytical, creative and problem solving practical skills to meet the industry standards.
PO-3	Apply knowledge of computing principles to solve real time problems.
PO-4	Equip themselves with Empowered professional and ethical attitude and communicate effectively and work as a team.
PO-5	Implement independent projects of their own choice using latest tools.

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

PSO No.	Programme Specific Outcomes *Upon completion of these courses the student would*
PSO-1	quire academic excellence with professional skill for higher studies and research.
PSO-2	Achieve greater heights in various sectors of IT Industrythrough analytical design and implementation skills.
PSO-3	Identify and apply computing practices to succeed as an employee or an entrepreneurial pursuit.
PSO-4	Be ethically and professionally responsible with the ability to relatecomputer applications to broader social context for the growth of the nation.
PSO-5	eate, select and apply modern tools and techniques to analyze and develop a successful software sy stem.

*The (Intended) Programme Outcomes and the Programme Specific
Outcomes should come before the first paper of the first semester only.

Course Title	MAJOR CORE 4 – DATABASE SYSTEMS AND DATA MINING		
Code	U17CS3MCT04		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and Relate file management systems with DBMS	PSO 1	R
CO-2	Design relations using Database Schema	PSO 4	Ap
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 3	An
CO-5	Sketch and Relate E-R diagrams with relations	PSO 4	An
CO-6	Apply SQL queries to access the data	PSO 3	C
CO-7	Recognize the importance of Data Mining	PSO 3	U
CO-8	Illustrate the classification, clustering and outlier detection of data	PSO 4	E

Course Title	MAJOR CORE 6 – OPERATING SYSTEMS		
Code	U17CS4MCT06		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the different structures of operating systems	PSO 1	R
CO-2	Discuss theory and implementation of processes, resource control, physical and virtual memory, scheduling, I/O and files	PSO 2	Ap
CO-3	Calculate waiting time, response time, turnaround time and disk seek time in disk scheduling	PSO 2	Ap
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	U

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	State OOPS and Relate java syntax with c and C++.	PSO 3	R, U
CO-2	Categorize OOPS such as encapsulation, abstraction, polymorphism.	PSO 1	R
CO-3	Apply encapsulation concepts in developing the programs with classes and objects.	PSO 5	Ap
CO-4	Identify different types of inheritance and apply them for reusability of code.	PSO 2	Ap
CO-5	Construct the packages by arranging the classes with visibility control.	PSO 1	Ap
CO-6	Design program using different methods of thread creation and exception handling.	PSO 1	U
CO-7	Create Internet program using applets.	PSO 4	An
CO-8	Evaluate java collection with other implementation methods of data structure.	PSO 1	U,R

Course Title	MAJOR CORE 8 – SOFTWARE ENGINEERING CONCEPTS		
Code	U17CS5MCT08		
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

Course Title	Major Core 9– Computer Organization and Architecture		
Code	**U17CS5MCT09**		
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	Ilustrate 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	Apply Basic Knowledge on Various Building Blocks of a Digital Computer and Architecture	PSO 4	R,U

Course Title	MAJOR ELECTIVE 2 – BIGDATA TECHNOLOGIES AND TOOLS		
Code	**U18CS5MET04**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Summarize the basics of Big Data Analytics	PSO 1	R, U
CO-2	Distinguish various Big Data Analytic Systems	PSO 1 & PSO 2	R
CO-3	Compare various components of Hadoop Framework	PSO 2	U
CO-4	Categorize the NoSQL databases	PSO 2	U
CO-5	Discuss Real Time Analytics Framework	PSO 1 & PSO 2	An
CO-6	Evaluate Real Time Analytics and Streaming Analytics	PSO 3	U, An

Course Title	MAJOR ELECTIVE 2 – BUSINESS PROCESS OUTSOURCING		
Code	U18CS5MET05		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and relate the concept of outsourcing and identify different types of outsourcing.	PSO 4	R, U
CO-2	Explain BPO Companied in India and world-wide.	PSO 2	R
CO-3	Apply call centers and appreciate the use of BPOs in Healthcare systems.	PSO 3	Ap
CO-4	Examine Transaction Processing BPO and Human Resource BPO.	PSO 3	R
CO-5	Plan for Career Opportunities in the BPO Industry.	PSO 1	R
CO-6	Evaluate the Offshore BPO.	PSO 2	E

Course Title	MAJOR ELECTIVE 2: INTRODUCTION TO CLOUD COMPUTING		
Code	U18CS5MET06		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the various basic concepts related to cloud computing technologies	PSO 5	E, U
CO-2	Know and explain the Infrastructure oriented mechanisms.	PSO 2	U
CO-3	Explain the fundamental cloud architectures	PSO 2	U
CO-4	Explain the architecture and concept of different cloud models: IaaS, PaaS, SaaS	PSO 1	An
CO-5	Explain major security and privacy problems in the cloud and how they are addressed with the security mechanisms.	PSO 5	An

Course Title	SKILL BASED ELECTIVE 4: COMPETITIVE EXAMINATION SKILLS		
Code	U15CS5SBT04		
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	R, U
CO-2	Demonstrate various principles involves in solving mathematical problem and thereby reducing the time taken for performing job function.	PSO 5	R, A
CO-3	Define and describe several examples of verbal reasoning problem.	PSO 1	U
CO-4	Demonstrate the use of series of techniques and analogies.	PSO 1	R, A
CO-5	Solve the various problem and solution in puzzles concepts.	PSO 3	A

Course Title	MAJOR CORE 12 - COMPUTER NETWORKS		
Code	U18CS6MCT12		
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 and Mobile Telephone System.	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

Course Title	MAJOR CORE 14 – COMPUTER GRAPHICS		
Code	U18CS6MCT14		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Associate the computer graphics display technologies and various input devices.	PSO 4	U
CO-2	Illustrate line drawing and circle generating algorithms.	PSO 2	A
CO-3	Discuss various attributes of output primitives.	PSO 5	U
CO-4	Illustrate and relate 2D geometric transformations and clipping techniques.	PSO 2	A
CO-5	Explain the concepts of 3D.	PSO 3	R, U
CO-6	Explain the concepts of 2D Viewing.	PSO 3	R, U

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DEPARTMENT OF COMPUTER SCIENCE
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PO-5	Implement independent projects of their own choice using latest tools.

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

PSO No.	Programme Specific Outcomes *Upon completion of these courses the* *student would*
PSO-1	quire academic excellence with professional skill for higher studies and research.
PSO-2	Achieve greater heights in various sectors of IT Industrythrough analytical design and implementation skills.
PSO-3	Identify and apply computing practices to succeed as an employee or an entrepreneurial pursuit.
PSO-4	Be ethically and professionally responsible with the ability to relatecomputer applications to broader social context for the growth of the nation.
PSO-5	eate, select and apply modern tools and techniques to analyze and develop a successful software sy stem.

The (Intended) Programme Outcomes and the Programme Specific
Outcomes should come before the first paper of the first semester on

Course Title	MAJOR CORE 7: JAVA PROGRAMMING		
Code	**U17CS5MCT07**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	State OOPS and Relate java syntax with c and C++.	PSO 3	R, U
CO2	Categorize OOPS such as encapsulation, abstraction, polymorphism.	PSO 1	R
CO-3	Apply encapsulation concepts in developing the programs with classes and objects.	PSO 5	Ap
CO-4	Identify different types of inheritance and apply them for reusability of code.	PSO 2	Ap
CO-5	Construct the packages by arranging the classes with visibility control.	PSO 1	Ap
CO-6	Design program using different methods of thread creation and exception handling.	PSO 1	U
CO-7	Create Internet program using applets.	PSO 4	An
CO-8	Evaluate java collection with other implementation methods of data structure.	PSO 1	U,R

Course Title	MAJOR CORE 8 – SOFTWARE ENGINEERING CONCEPTS		
Code	U17CS5MCT08		
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

Course Title	MAJOR CORE 9 – OPERATING SYSTEMS		
Code	**U15CS5MCT09**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Recall the different structures of operating systems	PSO 1	R
CO-2	Discuss theory and implementation of processes, resource control, physical and virtual memory, scheduling, I/O and files	PSO 2	Ap
CO-3	Calculate waiting time, response time, turnaround time and disk seek time in disk scheduling	PSO 2	Ap
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	U

Course Title	SKILL BASED ELECTIVE 4: COMPETITIVE EXAMINATION SKILLS		
Code	**U15CS5SBT04**		
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	R, U
CO-2	Demonstrate various principles involves in solving mathematical problem and thereby reducing the time taken for performing job function.	PSO 5	R, A
CO-3	Define and describe several examples of verbal reasoning problem.	PSO 1	U
CO-4	Demonstrate the use of series of techniques and analogies.	PSO 1	R, A
CO-5	Solve the various problem and solution in puzzles concepts.	PSO 3	A

Course Title	MAJOR CORE 12 - COMPUTER NETWORKS		
Code	U18CS6MCT12		
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 Mediaand understands the working of PublicSwitched Telephone Network and Mobile TelephoneSystem.	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

Course Title	MAJOR CORE 14 – COMPUTER GRAPHICS		
Code	**U18CS6MCT14**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Associate the computer graphics display technologies and various input devices.	PSO 4	U
CO-2	Illustrate line drawing and circle generating algorithms.	PSO 2	A
CO-3	Discuss various attributes of output primitives.	PSO 5	U
CO-4	Illustrate and relate 2D geometric transformations and clipping techniques.	PSO 2	A
CO-5	Explain the concepts of 3D.	PSO 3	R, U
CO-6	Explain the concepts of 2D Viewing.	PSO 3	R, U

Course Title	MAJOR ELECTIVE 3 – BIGDATA TECHNOLOGIES AND TOOLS		
Code	**U17CS6MET07**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Summarize the basics of Big Data Analytics	PSO 1	R, U
CO-2	Distinguish various Big Data Analytic Systems	PSO 1 & PSO 2	R
CO-3	Compare various components of Hadoop Framework	PSO 2	U
CO-4	Categorize the NoSQL databases	PSO 2	U
CO-5	Discuss Real Time Analytics Framework	PSO 1 & PSO 2	An
CO-6	Evaluate Real Time Analytics and Streaming Analytics	PSO 3	U, An

Course Title	MAJOR ELECTIVE 3 – BUSINESS PROCESS OUTSOURCING		
Code	**U17CS6MET08**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Recall and relate the concept of outsourcing and identify different types of outsourcing.	PSO 4	R, U
CO-2	Explain BPO Companied in India and world-wide.	PSO 2	R
CO-3	Apply call centers and appreciate the use of BPOs in Healthcare systems.	PSO 3	Ap
CO-4	Examine Transaction Processing BPO and Human Resource BPO.	PSO 3	R
CO-5	Plan for Career Opportunities in the BPO Industry.	PSO 1	R
CO-6	Evaluate the Offshore BPO.	PSO 2	E

Course Title	MAJOR ELECTIVE 3: INTRODUCTION TO CLOUD COMPUTING		
Code	U17CS6MET09		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the various basic concepts related to cloud computing technologies	PSO 5	E, U
CO-2	Know and explain the Infrastructure oriented mechanisms.	PSO 2	U
CO-3	Explain the fundamental cloud architectures	PSO 2	U
CO-4	Explain the architecture and concept of different cloud models: IaaS, PaaS, SaaS	PSO 1	An
CO-5	Explain major security and privacy problems in the cloud and how they are addressed with the security mechanisms.	PSO 5	An

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-2.
DEPARTMENT OF COMPUTER SCIENCE
Programme: M.Sc. Computer Science

PO No.	ProgrammeOutcomes *Upon completion of the M.Sc. Degree Programme, the graduate will be able to*
PO-1	Attain a sound understanding of the general principles of Computer Science.
PO-2	Obtain exposure to innovative, research-based topics within computing.
PO-3	Acquire leadership qualities, and good communication, teamwork, social, and professional skills.
PO-4	Understand the impact of computer science solutions in a global and societal context.
PO-5	Apply knowledge of computing to produce effective designs and solutions for specific problems.

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

PSO No.	Programme Specific Outcomes *Upon completion of these courses the student would*
PSO-1	Acquire academic excellence with an aptitude for higher studies and research.
PSO-2	Attain knowledge to develop and apply new computer technologies.
PSO-3	Contribute to the local society and the global community related to Computer Science.
PSO-4	Identify, formulate, and solve computer science problems.
PSO-5	Practice high standard of professional ethics.

The (Intended) Programme Outcomes and the Programme Specific
Outcomes should come before the first paper of the first semester only.

Course Title	MAJOR CORE 1: DISTRIBUTED TECHNOLOGIES		
Code	**P18CS1MCT01**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Describe various client server architectures.	PSO 1	R, U
CO-2	Illustrate various services of client server architecture.	PSO 2	R
CO-3	Describe and implement EJB.	PSO 2,4	U, An
CO-4	Discuss and implement various server controls using ASP.Net.	PSO 2,4	An, Ap
CO-5	Discuss data base connection using ADO.Net.	PSO 3,4	An , Ap
CO-6	Implement data base connection using ADO.Net.	PSO 4,5	An, Ap

Course Title	MAJOR CORE 2: ADVANCED OPERATING SYSTEM		
Code	**P18CS1MCT02**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Describe fundamentals of distributed operating system.	PSO 2	R, U
CO-2	Illustrate various operating system models.	PSO 1	U
CO-3	Discuss distributed shared memory mechanism.	PSO 1	U
CO-4	Explain resource management techniques.	PSO 4	U
CO-5	Compare various v-system and mach operating system.	PSO 5	An
CO-6	Describe various approaches in process management techniques.	PSO 2	R,U

Course Title	MAJOR CORE 3 – DATABASE SYSTEMS		
Code	P18CS1MCT03		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Describe various databases and data models.	PSO 1	R, U
CO-2	Explain the basic concepts of SQL and ER model.	PSO 4	R
CO-3	Design ER models to represent simple database application scenarios.	PSO 2	C
CO-4	Construct SQL queries.	PSO 4	C
CO-5	Illustrate various normalization forms.	PSO 1	An
CO-6	Discuss types of storage media, concepts of indexing methods including B tree and hashing.	PSO 4	U
CO-7	Explain the concepts of transactions and various concurrency control protocols.	PSO2	R

Course Title	MAJOR ELECTIVE 1: DESIGN AND ANALYSIS OF ALGORITHMS		
Code	**P18CS1MET01**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Analyze and differentiate the types of asymptotic notations	PSO 1	An
CO-2	Learn and illustrate the divide and conquer method and greedy algorithms	PSO 3	U
CO-3	Know and explain the dynamic programming method	PSO 1	U
CO-4	Learn and tell Backtracking concepts	PSO 4	U
CO-5	Know and distinguish the Basic traversals	PSO 1	U

Course Title	MAJOR CORE 7: OOAD AND UML		
Code	**P18CS2MCT07**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**ognitive Level**
CO-1	Describe object oriented system approaches and various phases of SDLC.	PSO 1	R, U
CO-2	Analyze various object oriented methodologies and UML	PSO 2	An
CO-3	Analyze different use cases, objects and methods.	PSO 3	U, An
CO-4	Illustrate design axioms, classes and interfaces.	PSO 4	R, U
CO-5	Discuss basic behavioral models with activity, state chart diagrams.	PSO 3,4	An
CO-6	Create model for real system based on different models	PSO 4,5	An, Ap

Course Title	Major Elective 2: Principles Of Compiler Design		
Code	**P18CS2MET05**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Explain the concepts of compiler and discuss the lexical analysis.	PSO 1	R,U
CO-2	Describe the functionality of Lexical and Syntax analysis.	PSO 1	R,U
CO-3	Illustrate the concepts of parser and its types.	PSO 1	R,U
CO-4	Define the storage organization and List the intermediate codes.	PSO 1	R,U
CO-5	Summarize the working features of Code Generation	PSO 1	R,U
CO-6	Describe the features of Code Optimization	PSO1	R,U

Course Title	MAJOR CORE 12 – XML AND WEB SERVICES		
Code	**P18CS3MCT12**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Explains the basic concepts of XML	PSO 1	R, U
CO-2	Distinguishes DTD and Schema	PSO 2	An
CO-3	Differentiates XLL and XML Parsers	PSO 2	An
CO-4	Summarizes various distributed technologies and illustrates the basic of web services and its layered architecture	PSO 3	E
CO-5	Recognizes the protocols behind web services including WSDL,UDDI and SOAP	PSO 4	An

Course Title	MAJOR ELECTIVE 4: BIGDATA ANALYTICS		
Code	**P18CS3MET10**		
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 explains the fundamentals and categorize and summarize Big Data and its importance.	PSO 1,PSO2	R,U
CO-2	identifies the usage of big data analytics and itsapplications	PSO 2, PSO 4	U,AN
CO-3	summarizes operationalizing big data in various environment	PSO 1,PSO2	R,U
CO-4	differentiate various Big data technologies like Hadoop MapReduce	PSO 2, PSO 4	U,AN
CO-5	distinguish various big data analytic systems.	PSO 1,PSO2	R,U
CO-6	apply tools and techniques to analyze Big Data.	PSO1, PSO5	U,Ap

Course Title	MAJOR ELECTIVE 5: NETWORK SECURITY AND CRYPTOGRAPHY		
Code	P18CS3MET13		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	describe the fundamental knowledge in computer network security	PSO 1,PSO2	R,U
CO-2	discuss various symmertric key algorithms with example	PSO 2, PSO 4	U,A N
CO-3	identify hash and digital signatures of Network communication	PSO 1,PSO2	R,U
CO-4	explain transport level of network security	PSO 1, PSO 2	R,U
CO-5	understand about email-security	PSO 1,PSO2	R,U
CO-6	apply security in real time application	PSO1 , PSO5	U,Ap

Course Title	SELF STUDY PAPER – PROFESSIONAL ETHICS		
Code	P17CS3SST01		
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 2	R, U
CO-2	Develop a responsible attitude towards the use of computer as well as the technology able to envision the societal impact on the products/ projectsthey develop in their career	PSO 2,6	R, An
CO-3	Understand the code of ethics and standards of computer Professionals	PSO 2	U, A
CO-4	Analyze the professional responsibility and empowering access to information in the work place	PSO 3	R
CO-5	Understand social networking ethical issues	PSO 3	U
CO-6	Apply ethical values in the working environment	PSO 3	Ap

Course Title	Major Core 14: Internet of Things		
Code	**P18CS4MCT14**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Explain what is Internet of Things.	PSO 2	U
CO-2	Describe key technologies in Internet of Things.	PSO 2	U
CO-3	Compares wireless sensor network architecture andi framework along with WSN applications.	PSO 2	U
CO-4	Explain resource management in the Internet of Things.	PSO 3	U
CO-5	Summarize business models for the Internet of Things	PSO 1	R, U
CO-6	Illustrate the Framework for Distributed Data Analysis for IoT	PSO 2	U
CO-7	Discuss about various security and privacy in IoT	PSO 2	U
CO-8	Develop skill about RFID Technology, Se management	PSO2	R,U

Course Title	MAJOR CORE 10: OPEN SOURCE TOOLS		
Code	**P15CS3MCT10**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Define and illustrate the various linux commands and Explain common open source licenses and the impact of choosing a license.	PSO 2	R, U
CO-2	Discuss general concept of php scripting language and construct simple php program.	PSO 2,6	R, U
CO-3	Explain the database connectivity using mysql.	PSO 2	U
CO-4	Explain basic knowledge of python and construct simple python program.	PSO 3	Ap
CO-5	Explain the advantage of using perl including control structure and Expression.	PSO 4	U

Course Title	MAJOR CORE 11: COMPUTER NETWORKS AND NETWORK SECURITY		
Code	**P15CS3MCT11**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Describe the fundamental knowledge in computer network communication.	PSO 1	R, U
CO-2	Discuss OSI reference model and compare with other model.	PSO 2	R
CO-3	Compare the technical factors of each layer in OSI reference model.	PSO 2	U, An
CO-4	Explain the fundamentals of network security.	PSO 4	R
CO-5	Learn the encryption and digital signature techniques.	PSO 3,4	An , Ap
CO-6	Illustrate various encryption techniques with applications involved.	PSO 4,5	An, Ap

Course Title	MAJOR ELECTIVE 4: DESIGN AND ANALYSIS OF ALGORITHMS		
Code	**P16CS3MET07**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Analyze and differentiate the types of asymptotic notations	PSO 1	An
CO-2	Learn and illustrate the divide and conquer method and greedy algorithms	PSO 3	U
CO-3	Know and explain the dynamic programming method	PSO 1	U
CO-4	Learn and tell Backtracking concepts	PSO 4	U
CO-5	Know and distinguish the Basic traversals	PSO 1	U

Course Title	MAJOR ELECTIVE 5 – XML AND WEB SERVICES		
Code	**P15CS3MET09**		
CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Explains the basic concepts of XML	PSO 1	R, U
CO-2	Distinguishes DTD and Schema	PSO 2	An
CO-3	Differentiates XLL and XML Parsers	PSO 2	An
CO-4	Summarizes various distributed technologies and illustrates the basic of web services and its layered architecture	PSO 3	E
CO-5	Recognizes the protocols behind web services including WSDL,UDDI and SOAP	PSO 4	An

Course Title	SELF STUDY PAPER – PROFESSIONAL ETHICS		
Code	**P17CS3SST01**		
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 2	R, U
CO-2	Develop a responsible attitude towards the use of computer as well as the technology able to envision the societal impact on the products/ projectsthey develop in their career	PSO 2,6	R, An
CO-3	Understand the code of ethics and standards of computer professionals	PSO 2	U, A
CO-4	Analyze the professional responsibility empowering access to information in the work place	PSO 3	R
CO-5	Understand social networking ethical issues	PSO 3	U
CO-6	Apply ethical values in the working environment	PSO 3	Ap

Course Title	MAJOR CORE 14: DOT NET TECHNOLOGIES		
Code	P16CS4MCT14		
CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	1. Describes the Architecture & features of DOTNET Framework and VS 2012 IDE.	PSO 2	R, U
CO-2	2. Recalls the Object Oriented Programming concepts in C# programming.	PSO 2,6	R, An
CO-3	3. Introduces and understand the WPF Class Hierarchy with Application model with relevant to Flow control mechanisms.	PSO 2	U, A
CO-4	4. Applies the Database connectivity in WPF and ASP.NET applications.	PSO 3	R
CO-5	5. Classifies the Web standard controls of DOTNET Technology.	PSO 4	R, An
CO-6	6. Classifies Validation controls of DOTNET Technology.	PSO 4	U