Department of Computer Science

M.Sc. Computer Science

S.No	Course Code	Course Name	Course Outcomes
			SEMESTER- I
1.	23PCSC11	**Core Course – I:** Analysis & Design ofAlgorithms	**CO1[K1]:** describe the fundamentals of designing and analyzing the algorithm **CO2[K2]:** explain elementary data structures, divide & conquer, greedy method,basic traversal & searching technique, backtracking **CO3[K3]:** use binary search, merge & quick sort, minimum cost spanning trees,knapsack to solve simple sorting & searching problem **CO4[K4]:** analyze divide and conquer, greedy, dynamic programming, backtracking methodologies and compare different data structures **CO5[K5]:** choose elementary data structures, sorting techniques, dynamic programming and basic traversal searching techniques.

2.	23PCSC12	**Core Course – II:** Object Oriented Analysis and Design & C++	**CO1[K1]:** define the concepts of Object-Oriented Analysis and Design **C02[K2]:** illustrate the concepts of Objects and various C++ OOPs features **CO3[K3]:** apply C++ concepts to solve simple problems **CO4[K4]:** examine Object Oriented features of C++ **CO5[K5]:** develop simple C++ program with Object Oriented Concepts
3.	23PCSO11	**Elective Courses Generic/ Discipline Specific - I:** Python Programming	**CO1[K1]:** define the concepts of Python Paradigms **CO2[K2]:** explain the Python concepts **CO3[K3]:** develop simple python applications using functions, dictionaries,files, client server and map reduce **CO4[K4]:** examine modules, packages, dictionaries, Map reducing, web clientand web server, and working in clouds **CO5[K5]:** assess objects, exception handling ,map reduce, client server inpython applications
4.	23PCSO12	**Elective Courses Generic/ Discipline Specific - I:** Critical Thinking, Design Thinking andProblem Solving	**CO1[K1]:** explain the concepts of Critical thinking and its related technology **CO2[K2]:** define the critical thinking and problem solving skills **CO3[K3]:** apply design thinking in problems **CO4[K4]:** analyze the concepts of Thinking patterns, Problem solving & Reasoningin real time applications **CO5[K5]:** categorize a decision and take actions based on analysis

5.	23PCSO13	**Elective Courses Generic/ Discipline Specific - II:** Embedded Systems	**CO1[K1]:** describe the concepts in Embedded System **CO2[K2]:** discuss Embedded System features **CO3[K3]:** apply 8051 instruction set and programming and embedded softwaredevelopment tools **CO4[K4]:** analyze various real time embedded systems using RTOS **CO5[K5]:** evaluate the importance of Embedded System
6.	23PCSO14	**Elective Courses Generic/ Discipline Specific - II:** Digital Image Processing	**CO1[K1]:** describe the fundamental concepts of digital image, image enhancement, imagerestoration, image compression, image segmentation and edge detection **CO2[K2]:** explain the image enhancement using filters, filters in image restoration, morphological image processing, image segmentation and edge detection **CO3[K3]:** use various filters in image enhancement and image restoration and basic algorithms for morphological image processing , image compression and various operators in edge detection **CO4[K4]:** compare lossy and lossless compression and various operators in Edge detection **CO5[K5]:** choose appropriate technique for image enhancement, restoration, compression,segmentation and Edge detection

7.	23PCSC1P	**Core Course – III:** Algorithm and OOPS Lab	**CO1[K2]:** demonstrate the concepts of OOPs using C++. **CO2[K3]:** use the OOPs concepts for sorting and searching methods **CO3[K4]:** simplify the development of solution using C++ and algorithms. **CO4[K5]:** choose required data structure and C++ concepts to solve a problem. **CO5[K6]:** develop simple C++ programs
8.	23PCSC1Q	**Core Course – IV:** Python Programming Lab	**CO1[K2]:** demonstrate basic python concepts **CO2[K3]:** use different python features **CO3[K4]:** compute various operations using python **CO4[K5]:** choose required python constructs to solve simple problem **CO5[K6]:** develop applications using python
SEMESTER- II			
9.	23PCSC21	**Core Course – V:** Data Mining andWarehousing	**CO1[K1]:** describe basic concepts of data mining and warehousing **CO2[K2]:** explain data mining techniques and concepts of warehousing **CO3[K3]:** use data mining algorithms **CO4[K4]:** compare and evaluate different data mining techniques **CO5[K5]:** evaluate the use of data mining algorithms to solve real world problems

10.	23PCSC22	**Core Course – VI:** Advanced Java Programming	**CO1[K1]:** define various concepts of Java Programming **CO2[K2]:** explain various Java Programming concepts **CO3[K3]:** apply the concepts of Java to develop simple programs **CO4[K4]:** examine advanced Java programming techniques **CO5[K6]:** develop simple java programming applications
11.	23PCSO21	**Elective Courses Generic/ DisciplineSpecific - III:** Advanced Operating Systems	**CO1[K1]:** define the basic concepts, principles and functions of Operating System. **CO2[K2]:** explain the features of various operating systems. **CO3[K3]:** determine concepts of RTOS, Distributed OS, Handheld device OS **CO4[K4]:** analyze the concepts of operating system. **CO5[K5]:** assess how an operating system functions
12.	23PCSO22	**Elective Courses Generic/ DisciplineSpecific - III:** Wireless Network	**CO1[K1]:** define the basics of wireless networks, spread spectrum, IEEE architecture **CO2[K2]:** explain wireless networks, protocol architecture, IEEE architecture, IoT andbluetooth and LTE **CO3[K3]:** outline the process of FHSS, DSSS, CDMA, LAN, MAN, WAN, OSI, TCP/IP, Bluetooth,LTE, IEEE 802.11 and IEEE 802.15 standards. **CO4[K4]:** compare the FHSS, DSSS, CDMA, LAN, MAN, WAN, OSI,TCP/IP, Bluetooth, LTE, IEEE 802.11 and IEEE 802.15 standards. **CO5[K5]:** evaluate the FHSS, DSSS, CDMA, LAN, MAN, WAN, OSI, TCP/IP, Bluetooth, LTE,IEEE 802.11 and IEEE 802.15 standards

13.	23PCSO23	**Elective Courses Generic/ DisciplineSpecific - IV:** Internet of Things	**CO1[K1]:** define the key components in IoT **CO2[K2]:** describe basic electronics used in IoT & its role **CO3[K3]:** develop simple applications using Arduino IDE **CO4[K4]:** analyze the working of various sensors and actuators **CO5[K5]:** evaluate the usage of IoT in real world environment
14.	23PCSO24	**Elective Courses Generic/ DisciplineSpecific - IV:** Mobile Computing	**CO1[K1]:** describe the Mobile Computing Architecture,mobile devices, GSM, CDMA,3Gand 4G and short range networks **CO2[K2]:** explain GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE, Wireless LAN, WIMAXandBLUETOOTH. **CO3[K2]:** interpret the GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE, Wireless LAN,WIMAX and BLUETOOTH. **CO4[K4]:** examine the Working of GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE,Wireless LAN, WIMAX and BLUETOOTH. **CO5[K5]:** discuss the Process of GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE,Wireless LAN, WIMAX and BLUETOOTH.
15.	23PCSC2P	**Core Course – VII:** Advanced Java Programming Lab	**CO1[K2]:** demonstrate the concepts of Java **CO2[K3]:** apply Java concepts to solve simple problem **CO3[K4]:** examine the working of Java constructs in various applications **CO4[K5]:** assess the ways to handle databases, applets, servlets, and JSP using Java **CO5[K6]:** develop a simple applications using java

16.	23PCSC2Q	**Core Course – VIII:** – Data Mining Lab using R	**CO1[K2]:** demonstrate data mining techniques **CO2[K3]:** apply different data mining algorithms to solve real world applications. **CO3[K4]:** compare different visualizations techniques using R. **CO4[K5]:** inspect the working of various R Commands **CO5[K6]:** develop a solution using R with simple dataset.
17.	23PCSN21	**Non Major Elective Course – I:** OfficeAutomation	**CO1[K2]:** demonstrate the features of word processing , spreadsheet and powerpoint tool **CO2[K3]:** apply various features of Office package **CO3[K4]:** examine the appropriate tools and options to create document, worksheet andpresentation **CO4[K5]:** select appropriate tools and options to create document, Worksheet andpresentation **CO5[K6]:** design a simple document, presentation slide and do calculation in Worksheets
18.	23PCSC31	**Core Course – IX :** Network Security and Cryptography	**CO1[K1]:** describe the concepts of Cryptography and Security **CO2[K2]:** explain Cryptography and Security concepts **CO3[K3]:** apply simple encryption and decryption techniques **CO4[K4]:** compare different encryption and decryption techniques to solve problemsrelated to confidentiality and authentication **CO5[K5]:** evaluate the use of appropriate security techniques to solve networksecurity problem

19.	23PCSC32	**Core Course – X:** Cloud Computing	**CO1[K1]:** describe the concepts of Cloud computing. **CO2[K2]:** explain the services given by cloud computing. **CO3[K3]:** write about various features of cloud computing.**CO4[K4]:** examine the cloud applications **CO5[K5]:** evaluate the working of cloud computing
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20.	23PCSO31	**Elective Courses Generic/ DisciplineSpecific - V:** Advanced Software Engineering	**CO1[K1]:** describe the Software Engineering process. **CO2[K2]:** explain about Software project management skills, design and qualitymanagement **CO3[K3]:** write about the terminologies of software engineering **CO4[K4]:** analyze Software Requirements Specification, Software testing,Maintenance and Software Re-Engineering **CO5[K5]:** evaluate the software designing Software Requirements specification,Software Testing, Maintenance and software re-engineering
21.	23PCSO32	**Elective Courses Generic/ DisciplineSpecific - V:** Software Project Management	**CO1[K1]:** describe the key phases of software project management **CO2[K2]:** explain software project and programme management, project and activity planning, project evaluation, risk management, monitoring andcontrol, managing contracts, people and environment **CO3[K3]:** apply project and programme management, project and activity planning, project evaluation and risk management **CO4[K4]:** examine project planning, activity planning and risk management in software project management **CO5[K5]:** discuss case studies on stakeholder identification, cost analysis, project Planning and network planning models

22.	23PCSO33	**Elective Courses Generic/ Discipline Specific - VI:** Artificial Intelligence & Machine Learning	**CO1[K1]:** describe the AI problems and techniques **CO2[K2]:** explain AI and machine learning concepts **CO3[K3]:** apply the principles of AI **CO4[K4]:** analyze the impact of machine learning on applications **CO5[K5]:** evaluate various AI techniques and machine learning concepts
23.	23PCSO34	**Elective Courses Generic/ Discipline Specific - VI:** Robotic Process Automation for Business	**CO1[K1]:** demonstrate the benefits and ethics of RPA **CO2[K2]:** review the Automation cycle and its techniques **CO3[K3]:** discover inferences and information processing of RPA **CO4[K4]:** analyze RPA in Business Scenarios **CO5[K5]:** evaluate Robots & leveraging automation
24.	23PCSC3P	**Core Course – XI:** Cloud Computing Lab	**CO1[K2]:** demonstrate the concepts of cloud computing. **CO2[K3]:** apply various cloud programming concepts to solve problems on the cloud. **CO3[K4]:** analyze various cloud programming model. **CO4[K5]:** evaluate various cloud programming model. **CO5[K6]:** develop a solution based on the core concepts of the cloud computing Paradigm
25.	23PCSC3Q	**Core Course – XII:** Network Security and Cryptography Lab	**CO1[K2]:** demonstrate the basic concepts of Cryptography and Network Security. **CO2[K3]:** apply the algorithms for Cryptography and Network Security. **CO3[K4]:** examine the various malware attacks, encryption and decryption techniques. **CO4[K5]:** evaluate different encryption and decryption techniques. **CO5[K6]:** develop simple applications using cryptographic algorithms

26.	23PCSN31	**Non Major Elective Course – II:** Web Designing	**CO1[K1]:** define the concepts of HTML and JavaScript **CO2[K2]:** demonstrate basic tags of HTML and elements of CSS **CO3[K3]:** develop a HTML page using text, images, tables, lists and links **CO4[K4]:** simplify to design a webpage using CSS **CO5[K5]:** choose the HTML and JavaScript constructs to design a website
27.	23PCSJ31	Internship/Industrial Training	**CO1 [K1]:** identify different career paths within the industry and gain insights intopotential future roles. **CO2 [K3]:** apply theoretical concepts and academic knowledge to real-world situations and challenges encountered during the internship. **CO3[K4]:** analyze problems, generate innovative solutions, and make informed decisions. **CO4[K5]:** evaluate how to manage time effectively and prioritize tasks to meet deadlinesand deliver quality work. **CO5[K6]:** create a portfolio of the work, projects, and achievements during the internship.
SEMESTER- IV			

28.	23PCSC41	**Core Course –XIII:** Data Science & Analytics	**CO1[K1]:** describe basics of data science steps, data analytics tools, terminologies, R,clustering and artificial intelligence basics **CO2[K2]:** compare and contrast data analytics tools, clustering, machine learning anddeep learning **CO3[K3]:** explain data science ecosystem, R graphical user interface, visualizingvariables, naive bayes and association rules **CO4[K4]:** summarize various clustering algorithms, data analytic life cycles, Bayestheorem, decision tree, and regression analysis **CO5[K5]:** discuss descriptive, exploratory, visualization of data analysis through R
29.	23PCSC4P	**Core Course –XIV:** Web Application Development & Hosting Lab	**CO1[K2]:** recall the basic HTML tags to create static web pages **CO2[K3]:** use hyperlinks, frames, images, tables, in a webpage **CO3[K4]:** analyse the required HTML tags to create an simple web applications **CO4[K5]:** assess various web applications developed using HTML and PHP. **CO5[K6]:** create web page using HTML & PHP.

30.	23PCSO41	**Elective Courses Generic/ DisciplineSpecific - VII:** Block Chain Technology	**CO1[K1]:** define the concepts of blockchain technology and crypto currency **CO2[K2]:** explain the fundamentals of blockchain and crypto currency **CO3[K3]:** apply and identify security measures, and various types of block chain services **CO4[K4]:** analyze Blockchain in various domains **CO5[K5]:** assess security, privacy, and efficiency of a Blockchain system
31.	23PCSO42	**Elective Courses Generic/ DisciplineSpecific - VII:** Compiler Design	**CO1[K1]:** describe the front end and back end process of the compiler during compilation **CO2[K2]**: explain the functionalities of each phase in compilation **CO3[K3]:** draw finite automata from regular expression, flow graph fromintermediate code and use context free grammar **CO4[K4]:** differentiate bottom up parsing, top down parsing and LR Parsing **CO5[K5]:** discuss the lexical analysis, syntax analysis, SDT, intermediate codegeneration, code optimization phases of compilation

32.	23PCSS4P	**Skill Enhancement Course**: **Professional Competency Course:** Computer Science for Competitive Exams	**CO1[K1]:** describe the basics of computers related to competitive exams **CO2[K2]:** explain the basic concepts in core areas **CO3[K3]:** use the various concepts and techniques in different domains of computer science and applications **CO4[K4]:** examine the different problematic domains to find the solution **CO5[K6]:** prepare themselves for competitive exams
33.	23PCSJ41	**Core Course –XV:** Project and Viva Voce	**CO1[K1]:** identify the unexplored areas of research **CO2[K2]:** outline the objectives in formulating a research paper **CO3[K3]**: apply the latest rules of documentation to cite Print, Non-print andWeb Publications in a research paper **CO4[K4]:** analyze the stages in writing a thesis – collecting and evaluating Sources and drafting documentation **CO5[K6]:** prepare a rightly documented research project with adequatediscussion, interpretation and evaluation
34.	-	**Extension Activity**	**CO1[K1]:** recognize the importance of community service through training and education **CO2[K2]:** interpret ecological concerns, consumer rights, gender issues & legal protection **CO3[K3]:** develop team spirit, verbal/nonverbal communication and organizational ethicsby participating in community service **CO4[K4]:** examine the necessity of professional skills & community-oriented services for a holistic development **CO5[K6]:** create awareness on human rights, legal rights, First Aid, Physical fitness andwell being