AQAR – QUALITATIVE METRIC

2022 - 2023

Criterion 1 - Curricular Aspects

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme specific outcomes (PSOs) and Course Outcomes (COs), of the Programmes offered by the Institution.

Name of the Programme: M.Sc Computer Science

Programme Outcomes:

Programme Educational Objectives (PEO)

PEO1	Our graduates will be academic, digital and information literates, creative, inquisitive, innovative and desirous for the "more" in all aspects.
PEO 2	They will be efficient individual and team performers who would deliver excellent professional service exhibiting progress, flexibility, transparency and accountability in their professional work.
PEO 3	The graduates will be effective managers of all sorts of real–life and professional circumstances, making ethical decisions, pursuing excellence within the time framework and demonstrating apt leadership skills.
PEO 4	They will engage locally and globally evincing social and environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment.

Programme Specific Outcome:

On completion of M.Sc. Computer Science programme, the students are expected to

PSO1	To develop professionally competent citizens by applying the scientific knowledge of Computer Science with the ability to think clearly, rationally and creatively to support in evolving solutions to the social/public/scientific issues with responsible democratic participation.
PSO2	Enterprising resourcefulness to identify, plan, formulate, design and evaluate solutions for complex computing problems that address the specific needs with appropriate consideration for Societal, Cultural, Environmental and Industrial domains.
PSO3	Holistic development to ignite the lateral thinking ability in problem solving, acquisition of new skills,open-minded and organized way of facing problems with self awareness and evolving analytical solutions
PSO4	Create and initiate innovations effectively and communicate efficiently with the computing community and society at large to bridge the gap between computing industry and academia
PSO5	Through Digital Literacy, understand, assess and commit to professional and ethical principles, norms and responsibilities of the cyber world and the ability for work efficacy as a

	part of a team and engage effectively with diverse stakeholders
PSO6	Ability and willingness to embark on new ventures and initiatives with critical thinking and desire for more continuous learning focusing on life skills.
PSO7	Use research-based knowledge and research methods to design, analyse, and interpret data and to synthesize information to provide valid findings to serve community.

Course Outcomes:

Course Code	**Course Title**	**Nature of the Course (Local / National / Regional / Global)**	**Course Description**	**Course Outcomes**
19PG1B1	Advanced Programming In Java	National	To understand the Networking concept using TCP/IP and RMI. To design and develop	CO1: Describe client/server applications, TCP/IP socket programming and distributed applications using RMI.

			java program using Swings Components.	CO2: Analyze and design Window based applications using Swing Objects. CO3: Develop and design Java programs using Swing components. CO4: Discuss the various JDBC drivers and demonstrate J2EE application using JDBC connectionand server side programs with Servlets. CO5: Write component-based Java programs using JavaBeans.
19PG1B2	Distributed Operating Systems	National	To understand the concept of design and implementation in the context of distributed operating systems.	CO1:Discuss the core concepts of distributed systems. CO2:Analyze various message passing mechanisms with its model. CO3:Identify the inherent difficulties that arise due to distribution of computing resources. CO4:Explain migration with the process management policies.

				CO5:Explain the basic concepts, design and structure of the LINUX operating system.
19PG1B3	Object Oriented Software Engineering	National	To understand a systematic discipline, quantifiable approach to the design development operation and maintenance of software using object oriented concept. To understand and apply different Object Oriented development models	CO1: Differentiate traditional and object oriented software engineering CO2: Explain various SDLC methods of OOSE CO3: Describe techniques used in OOSE CO4: Explain OOSE testing methods CO5: Analyze and choose necessary method for a particular project
19PG1B4	Theory Of Computation	National	To introduce the concept of automata theory, the theory of formal languages and grammars to understand the properties of physical	CO1: Demonstrate an in-depth understanding of theories, concepts and techniques in automata and their link to computation. CO2: Develop abstract machines that

			machines	demonstrate the properties of physical machines and be able to specify the possible inputs, processes and outputs of these machines. CO3: Analyze the computational strengths and weaknesses of these machines. CO4: Explain Context-Free Grammar. CO5: Apply automata concepts and techniques in designing systems that address real world problems.
19PG1B5	Lab-I-Advanced Programming In Java	National	To implement Server Side Program with Servlets. To develop java program using JSP.	CO1: Implementation of java applications that illustrate professionally acceptable coding and performance standards. CO2: Develop distributed applications using RMI. CO3: Design and develop event-driven programming and graphical user interfaces using Swing-based GUI.

				CO4: Design and develop Java programs using JDBC connection for data access and also Develop server side programs with Servlets. CO5: Design and develop component-based Java programs using JavaBeans.
19PG1B6	Lab-II-Operating System	National	To introduce the students to LINUX kernel programming To make the students aware of the features and capabilities of Linux so that they can utilize its improved functionalities	CO1: Utilize basic LINUX Utilities. CO2: Write different LINUX shell scripts and execute various shell programs. CO3: Apply LINUX system calls. CO4: Compute various file permissions and have a basic understanding of system security. CO5: Demonstrate the basic knowledge of Linux commands and file handling utilities by using Linux shell environment.

19B1EDC	Web Development	National	To enhance the knowledge of the students in effective webpage designing. To provide skills to sharply focus on needed information to be presented in a website.	CO1: Define various tags of HTML CO2: Design a web page with attractive display CO3: Create a Layout for a webpage using Block tags CO4: Explain how and where to apply CSS CO5: Design own website
19PG2B7	Extreme Programming – ASP.NET	National	To understand the Architecture of ASP.NET To acquire a working knowledge of the .NET programming model	CO1: Explain the important facts of ASP.NET 3.5, analyze and evaluate Web Form processing stages. CO2: Demonstrate web application using different types of Server Controls with input validation. Analysis and Identify state management techniques. CO3: Discuss Data Access Technology using ADO.NET architecture. CO4: Formulate Data Sources using SQL Data Source, Object Data Source

				and process data with rich data controls. CO5: Discuss and demonstrate Themes and Master pages of Web site.
22PG2B8	Digital Image Processing	National	To inculcate ideas and create interest in processing images techniques. To provide a research orientation inducing them to pursue research.	CO1: Explain the representation of digital image and its manipulations CO2: Analyze image sampling and quantization requirements and implications CO3: Describe various Transformation and Filtering Techniques CO4: Demonstrate Restoration And Reconstruction models CO5: Utilize Image Compression And Segmentation for efficient storage
19PG2B9	Design And Analysis Of Algorithms	National	Develop your ability to articulate processes for solving problems and to implement those processes efficiently within	CO1: Analyze the time and space complexity of given Algorithms. CO2: Demonstrate operations like searching, insertion, and deletion on various data structures. CO3: Identify appropriate

			software.	sorting/searching technique for given problem. CO4: Apply the dynamic programming technique to solve the problems. CO5: Discuss advanced tree and graph applications.
19PG2B10	Lab-III- Extreme Programming – ASP.NET	National	To design and develop dynamic Control and validate the inputs by validation controls To design and develop different State Management Techniques	CO1: Design and develop web applications using different Server Controls. CO2: Implement web applications with different state managements. CO3: Create Data Access Technology using ADO.NET architecture. CO4: Design and utilize Data Sources using SQL Data Source , Object Data Source for data manipulation operation. CO5: Design and develop web sites.
22PG2B11	LAB IV- DIGITAL IMAGE	National	To inculcate ideas and create interest in processing images	CO1: Demonstrate Fundamental Steps involved in Digital Image

	PROCESSING		techniques. To provide a research orientation inducing them to pursue research.	Processing CO2: Analyze and use Mathematical Tools for Digital Image Processing CO3: Apply Intensity Transformation functions and Spatial filtering methods CO4: Utilize Color Image Processing with different Color Models CO5: Implement Image Segmentation Techniques and Image Compression Techniques using Huffman, Golomb and Arithmetic coding algorithms
19PG2BE1	Computational Intelligence	National	Throws light on all categories of Evolutionary Computing To motivate to pursue research	CO1: Demonstrate the fundamental concepts of soft computing and its applications. CO2: Explain the concepts of fuzzy sets, knowledge representation using fuzzy rules, and othermachine intelligence applications of fuzzy logic. CO3: Discuss the basics of an evolutionary computing

				CO4: Explain genetic algorithms for practical problems. CO5: Discuss the performance of granular computing in solving specific problems.
19PG2BE2	Neural Networks	National	To understand the fundamentals of Neural Networks To apply various models and learning algorithms for the real world scenario	CO1: Explain the basic concepts of Neural Networks. CO2: Describe the various Neural Network models. CO3: Explain Learning Rules of Neural Network CO4: Distinguish Feedback and Feed forward networks CO5: Compare Special networks and discuss the applications of Neural Network.
19PG2BE3	Software Testing	National	To give strong foundation in software quality assurance by teaching standards, models and	CO1: Discuss various software application domains and different process model used in software development. CO2: Demonstrate the basics of

			measurement techniques. To enhance the knowledge of the students to provide innovative solutions to various quality assurances related problems.	software quality assurance and defect prevention. CO3: Compare different testing strategies and tactics. CO4: Describe the software testing techniques in different environments. CO5: Explain high performance testing using Jmeter.
19PG2BE4	Embedded Systems	National	To create interest in low level system programming To help students venture in to embedded designing concepts	CO1: Explain the concepts of embedded systems CO2: Analyze the architecture of embedded systems CO3: Describe about the processors and memory organization CO4: Distinguish when and where to apply embedded concepts CO5: Describe different embedded system design technologies
19B2EDC	Web Development	National	To enhance the knowledge of the	CO1: Define various tags of HTML CO2: Analyze information to provide

			students in effective webpage designing. To provide skills to sharply focus on needed information to be presented in a website.	attractive display CO3: Create clear webpage for given data CO4: Explain how and where to apply CSS CO5: Design own website
22PG3B12	Machine Learning	National	To introduce the fundamentals of Machine Learning and algorithms. To impart the knowledge on supervised and unsupervised learning algorithms used for classification, prediction and clustering.	CO1: Explain the fundamental concept of Machine Learning. CO2: Analyse the decision tree and explain the Bayesian learning. CO3: Discuss the genetic algorithms CO4: Apply the learning set of rules and discuss the learning features CO5: Explain the Reinforcement learning and analyse the relationships to dynamic programming.
19PG3B13	Data Mining And Data Warehousing	National	To interpret the contribution of data	CO1: Explain the fundamental concept of Data Mining and analyze

			mining and data warehousing to the decision support level of organizations To understand different models used for OLAP and data pre-processing	and evaluate the data cleaning, integration , transformation and reduction techniques. CO2:Design multidimensional data using Data Warehouse architecture. CO3:Design and evaluate Classification algorithms. CO4:Identify the types of data in Cluster Analysis and categorize the Cluster Methods. CO5: Utilize the Data Mining techniques in various real applications and in major issues
22PG3B14	Lab V- Machine Learning With Python	National	To Acquire knowledge and Skills for creation of Web applications. To implement regression and Classification using Python	CO1: Design web applications using python programming CO2: Manipulate data using different queries. CO3: Extract features from the data set CO4: Implement Machine learning Algorithms

				CO5: Build data pipeline using machine learning in python.
19PG3B15	Lab-VI- Data Mining And Data Warehousing	National	Apply the association rules for mining the data Design and deploy appropriate classification techniques	CO1: Utilize Weka tool to evaluate Data Mining algorithms. CO2: Demonstrate preprocessing steps involved in different datasets. CO3: Analyze Data Mining techniques for realistic data. CO4: Develop the decision tree algorithm using different datasets. CO5: Demonstrate the classification and clusters algorithms using large datasets
19PG3BSI	Summer Internship/ Training/ Online Certification	National	Acquire knowledge of the industry in which the internship is done. Identify areas for future knowledge and skill development.	CO1: Identify employment contacts leading directly to a full-time job following course completion CO2: Create communication, interpersonal and other soft skills essential for the job interview process. CO3: Analyse the project requirements and engages in continuing

				professional development. CO4: Analyze a problem and identify the computing requirements appropriate to its solution. CO5: Utilizing a new software tool.
19PG3BE5	Python Programming	National	To introduce the concept of mobile computing and provide a foundation for research.	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: Synthesize principles and theories of computer science and software engineering for application to different computing paradigms. CO4: Design and develop software systems for various application domains. CO5: Manage the development of software systems through a variety of development processes and

				methodologies.
19PG3BE6	Cryptography And Network Security	National	Understand the most common type of cryptographic algorithm	CO1: Explain the various symmetric encryption techniques and demonstrate the functionalities of DES algorithm. CO2: Analyze public key algorithms. CO3: Evaluate the authentication concept and hash algorithms. CO4: Apply the concepts of key management techniques. CO5: Analyze the vulnerabilities in data communication through networks.
19PG3BE7	Distributed Database Management System	National	Aware of the main techniques for managing a distributed database management system and be able to design a simple distributed database system	CO1: Compare normal and distributed DBMS and to explain various approaches of DDBMS. CO2: Formulate various kinds of retrieving statements to retrieve information from DDB. CO3: Explain multiple processes dealing with distributed database

				system without clash CO4: Describe the set of protocols used in DDBMS to make effective communication. CO5: Discuss object concepts and object models.
19PG3BE8	Compiler Design	National	Introduce the theory and tools that can be employed in order to perform syntax-directed translation of a high-level programming language into an executable code.	CO1: Describe the phases of Compiler. CO2: Explain the role and type of Parser CO3: Analyze and use Intermediate languages CO4: Describe the design of code generation with register utilization. CO5: Demonstrate code optimization techniques.
19PG3BE9	Cloud Computing	National	Main focus is on parallel programming techniques for cloud computing and large scale distributed systems which form	CO1: Identify and use different cloud computing services. CO2: Explain the basic principles of cloud virtualization. CO3: Prepare the appropriate cloud

			the cloud infrastructure.	computing solutions to meet the requirement of specific applications. CO4: Design application by utilizing cloud platforms such as Google app Engine and Amazon Web Services. CO5: Analyze different cloud programming models.
19PG3BE10	Advanced Computer Graphics & Animation	National	The goal of the course is to provide a strong foundation for computer graphics principles, and provide a hands-on introduction to recent advanced topics.	CO1: Explain the basic concepts in computer graphics. CO2: Analyze various algorithms and to convert the basic geometrical primitives. CO3: Demonstrate the importance of viewing and clipping. CO4: Discuss the fundamentals of animation CO5: Describe Interpolation-Based Animation
19PG3BE11	Big Data Analytics	National	Understand the main Big Data tools and the use of predictive	CO1: Explain Characteristics and challenges of Big Data

			analytics on big data.	CO2: Describe Big Data Analytics CO3: Utilize Hadoop for Big Data Technologies CO4: Demonstrate MAP REDUCE Programming CO5: Describe types of Recommendation Systems using Big Data Analytics.
22PG3BE12	Cyber Forensics	National	Analyze various computer forensics systems. Learn to duplicate and preserve digital evidence.	CO1: Predict the forensics fundamentals and the various technologies used to avoid computer crimes CO2: Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene. CO3: Identify and Analyze Forensic Technical Surveillance Devices. CO4: Evaluate the Various tools and tactics followed in military. CO5: Demonstrate the Usage of surveillance tools for tracking cyber

				criminals
22PG3BE13	Mobile Communication	National	To have an exposure about GSM and Satellites. To be acquainted with the Mobile Internet Protocol.	CO1: Identify, Predict and Evaluate MAC, SDMA, TDMA, FDMA, CDMA CO2: Demonstrate the architectures, challenges and solutions of Wireless communication CO3: Assess the role of Wireless Networks in shaping the future internet. CO4: Design Mobile IP to support seamless and continuous Internet connectivity CO5: Design SIP to create, modify, and terminate a multimedia session over the Internet Protocol.
19PG4B16	Principles Of Internet Of Things (Self Study)	National	To understand the fundamentals of Internet of Things. To apply the concept of fundamentals of Internet of Things in	CO1: Explain the basic concepts of IoT. CO2: Discuss physical and logical design of IoT enabled technologies. CO3: Analyze how and where IoT can

			the real world scenario	be applied. CO4: Compare M2M and IoT. CO5: Describe the features of Python used for IoT implementation.
19PG4BPR	Project	National	Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.	CO1: Discuss project development and the associated business processes. CO2: Analyse problems and formulate solutions. CO3: Communicate with engineers and the community at large in written and oral forms. CO4: Create effective communication skills for presentation. CO5: Plan as an individual or in a team in development of technical projects.