



**Deccan Education Society's
Fergusson College (Autonomous), Pune**

Program Specific Outcomes (PSOs) and Course Outcomes (COs) 2019-20

Department of Computer Science

Programme: M.Sc. Computer Applications

PSO No.	Program Specific Outcomes (PSOs) Upon completion of this programme the student will be able to
PSO1	Academic competence: (i) Identify, formulate and solve real world computing system problems of various domains by understanding and applying the principles of mathematics, computing techniques and business concepts.
PSO2	Personal and Professional Competence: (i) Analyse, design, test, develop and maintain desktop, web, mobile and cross platform software applications using modern tools and technologies in an economical and affordable way.
PSO3	Research Competence: Research Competence: (i) Identify the potentiality to design experiments for complex problems, collect data, interpret data, develop, implement computer programs and use knowledge in various domains to identify research gaps and hence to provide solutions to new ideas and innovations.
PSO4	Entrepreneurial and Social competence: (i) Analyse and understand the evolutionary changes in computing by inculcating employability and entrepreneur skills among the lifelong learners with moral values and ethics. (ii) Develop skills required for social interaction.

Course Outcomes (COs)		
F. Y. M.Sc. Semester I		
Title of the Course and Course Code	Mathematical Foundation (CSA4101)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe fundamentals of set theory, relations, functions and graphs.	1
CO2	Explain different concepts of statistics using R programming.	2
CO3	Apply the concepts of graphs to solve various problems in day to day life.	3
CO4	Analyze various measures of location and dispersion on real data.	4
CO5	Evaluate the fundamental probability concepts.	5
CO6	Generate a Jordan canonical form by applying concepts of eigenvalues and eigenvectors.	6
Title of the Course and Course Code	Operating Systems (CSA4102)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the services and system calls provided by the operating system.	1
CO2	Discuss and articulate classical problems of process synchronization.	2
CO3	Apply process management and memory management concepts to solve different software problems.	3
CO4	Identify and determine analyze deadlock handling situations.	4
CO5	Evaluate the performance of different Disk scheduling algorithms and Page replacement algorithms.	5
CO6	Propose the best CPU Scheduling algorithm for a given problem instance.	6

Title of the Course and Course Code	Python Programming (CSA4103)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define basic constructs of Python language.	1
CO2	Illustrate strings and file handling operations of Python language.	2
CO3	Apply conditional and looping constructs to solve different problems. Demonstrate the use of built-in data structures.	3
CO4	Analyze the features of Python language to produce efficient and modular code.	4
CO5	Test and validate Python applications using Exception handling mechanism.	5
CO6	Write Python programs and learn its execution environment.	6
Title of the Course and Course Code	Database Management Systems (CSA4104)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the basic concepts of database management systems.	1
CO2	Discuss the concepts of concurrency control, transaction processing and recovery management.	2
CO3	Solve queries using SQL and Relational algebra.	3
CO4	Analyze database requirements and determine the entities involved in the system and their relationship.	4
CO5	Evaluate the normality of a logical data model and correct anomalies.	5
CO6	Develop programs in PL/SQL on Stored functions, Cursors, Triggers and Views.	6

Title of the Course and Course Code	Computer Applications Practical - I (Lab Based on Python Programming and Databases) (CSA4105)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify the concepts of Python programming and RDBMS to design solutions for different types of problems.	1
CO2	Explain the use of data structures of Python programming and stored functions, cursors, triggers and views in PL/SQL.	2
CO3	Implement stored functions, cursors, triggers and views using PL/SQL programming concepts.	3
CO4	Analyse and execute string handling, file handling and operations on data structures using controls statements, loops and functions.	4
CO5	Test and validate the outputs of Python programs and SQL queries.	5
CO6	Write programs to design applications using concepts of Python language and relational database concepts.	6
Title of the Course and Course Code	Computer Applications Practical - II (Lab Based on Operating Systems) (CSA4106)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe CPU scheduling and implement its algorithms.	1
CO2	Outline the storage system constraints for an operating system.	2
CO3	Illustrate the memory management constraints for an operating system.	3
CO4	Analyze the concepts of paging to find the performance of different page replacement algorithms.	4
CO5	Evaluate Banker's algorithm to determine deadlock avoidance.	5
CO6	Write programs for scheduling disk requests using different algorithms.	6

F. Y. M.Sc. Semester II		
Title of the Course and Course Code	Data Mining and Data Warehousing (CSA4201)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the basic concepts of data mining and data warehousing.	1
CO2	Discuss schema types of dimensional data modelling.	2
CO3	Apply pre-processing techniques to improve the overall quality of the pattern mined from the data.	3
CO4	Analyze classification and clustering algorithms.	4
CO5	Evaluate performance of association rule mining algorithms.	5
CO6	Perform data mining tasks using data mining tools.	6
Core Java (CSA4202)		
Title of the Course and Course Code	Core Java (CSA4202)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	List object oriented programming concepts.	1
CO2	Illustrate the programming constructs of Java.	2
CO3	Examine different classes for the effective use of file handling operations.	3
CO4	Analyze the usage of interfaces, packages and exceptional handling.	4
CO5	Determine the use of different Java libraries.	5
CO6	Write complex java programs by specifying the appropriate standard API library of Java.	6

Title of the Course and Course Code	Web Technologies (CSA4203)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe different concepts of PHP scripting language.	1
CO2	Explain different built-in functions of PHP to store and access databases.	2
CO3	Apply object oriented concepts in developing PHP applications.	3
CO4	Analyze built-in functions to draw different graphic images.	4
CO5	Determine different ways of storing information on the web server.	5
CO6	Design data and document centric applications by using XML language. Develop dynamic, database-driven web applications using PHP.	6
Title of the Course and Course Code	Networking Concepts (CSA4204)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define different data communication components in networking and describe its different types of models and topologies.	1
CO2	Explain Random access, controlled access and channelization protocols and discuss design issues.	2
CO3	Apply different line coding, transmission methods, switching techniques and examine their functions, error control techniques and protocols.	3
CO4	Analyse different network models and addressing schemes.	4
CO5	Review different architectures related to different protocols and compare different Wired and Wireless LANs.	5
CO6	Design subnet mask and classful IP addresses.	6

Title of the Course and Course Code	Software Testing (CSA4207)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the role of process in software quality and software testing principles.	1
CO2	Explain and compare different levels of testing.	2
CO3	Apply skills of software testing in different domains.	3
CO4	Identify appropriate automation testing tools and analyze their effectiveness.	4
CO5	Evaluate different test cases and experiment testing techniques.	5
CO6	Write the test cases to improve the efficiency of the applications.	6
Title of the Course and Course Code	Bigdata Analytics (CSA4208)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the importance of Big data and its applications.	1
CO2	Illustrate stream clustering using different algorithms.	2
CO3	Apply Map Reduce algorithms to perform different operations.	3
CO4	Analyze business drivers and data architecture patterns of NoSQL.	4
CO5	Determine core components of Hadoop.	5
CO6	Design efficient algorithms for mining the data from large volumes.	6

Title of the Course and Course Code	Computer Applications Practical - III Lab Based on Data mining and Core Java) (CSA4211)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify different packages of Java to implement object oriented concepts and extract patterns from large amounts of data to solve problems.	1
CO2	Illustrate concepts of file streams, operations in Java programming and explain different methods for data cleaning.	2
CO3	Implement java programs using the Java JDK environment and demonstrate different clustering algorithms.	3
CO4	Analyze different types of interfaces and different data mining tools and techniques.	4
CO5	Test, validate Java programs and evaluate measuring performance of a classifier.	5
CO6	Write simple event-based GUI interfaces for computer applications to interact with users and perform different types of regression techniques on large amounts of data sets.	6
Title of the Course and Course Code	Computer Applications Project - I (CSA4212)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	List and describe different problem statements.	1
CO2	Explain different software development life cycle models and approaches to solve the problem of a project.	2
CO3	Apply resource management skills for the project.	3
CO4	Integrate the modules using different techniques and tools.	4
CO5	Decide and draw relevant diagrams related to the concerned problem.	5
CO6	Prepare the solutions through presentations and technical reports for the concerned problem.	6

S. Y. M.Sc. Semester III		
Title of the Course and Course Code	Advanced Java (CSA5301)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify the appropriate structure for a given programming problem from a knowledge base of Java collections.	1
CO2	Illustrate access of the database through Java Database Connectivity (JDBC).	2
CO3	Implement client-server connection using socket programming.	3
CO4	Categorize different Mail Servers to send and receive emails.	4
CO5	Review working of JMS for a sender/receiver application.	5
CO6	Create dynamic web pages using servlets and JSP.	6
Title of the Course and Course Code	Software Engineering and UML (CSA5302)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	List and describe different life cycle models based on different factors.	1
CO2	Illustrate the purpose, major components and key mechanisms of structural modelling.	2
CO3	Examine different behavioural modelling diagrams of UML.	3
CO4	Analyse SRS to develop use cases for the project.	4
CO5	Evaluate the background and driving strengths for taking an Agile approach to Software Development.	5
CO6	Design real time applications using Object Oriented Analysis and Design Methodology.	6

Title of the Course and Course Code	Advanced Web Technologies (CSA5303)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Outline different web extensions and web services standards.	1
CO2	Explain the concepts of Drupal and its applications.	2
CO3	Demonstrate the data representation using JSON.	3
CO4	Analyse different concepts of XML and AJAX to design dynamic web pages.	4
CO5	Evaluate user requirements and create Web applications using relevant Web Technologies.	5
CO6	Design and develop Web Applications using advanced web technologies.	6
Title of the Course and Course Code	Mobile Technology (CSA5304)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define fundamentals of Wireless communication and transmission and describe different controlled access techniques.	1
CO2	Explain mobility approach at different layers of simplified reference model.	2
CO3	Examine different architectures of mobile technologies.	3
CO4	Compare wireless LANs based on different infrastructure types.	4
CO5	Determine different quality of services during mobility.	5
CO6	Develop technical competence in the field of mobile technology.	6

Title of the Course and Course Code	Full Stack (CSA5307)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define basic terms and concepts related to web development.	1
CO2	Explain the functionality of CSS3, HTML5, NoSQL.	2
CO3	Apply programming skills using Javascript and jQuery, a light-weight JavaScript library.	3
CO4	Analyze the components of Bootstrap.	4
CO5	Test and validate Javascript code.	5
CO6	Create, design and develop attractive user Interfaces for web applications.	6
Title of the Course and Course Code	Internet of Things (CSA5308)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define the Internet of Things and its applications.	1
CO2	Explain principles and components of RFID.	2
CO3	Implement security features to protect data.	3
CO4	Analyze different identity management models.	4
CO5	Determine fundamental IoT Mechanisms and Key Technologies.	5
CO6	Design and develop solutions using IoT.	6

Title of the Course and Course Code	Computer Applications Practical – IV (Lab Based on Advanced Java) (CSA5311)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify different Mail Servers to send and receive emails.	1
CO2	Discuss programs using Java collection API and Java standard class library.	2
CO3	Apply JDBC to provide a program level interface for communicating with databases using Java programming.	3
CO4	Explain client and server programs in Java using classes.	4
CO5	Evaluate flexible and powerful open source, multi-protocol, java based messaging server for JMS.	5
CO6	Create dynamic web pages using Java servlets and JSP.	6
Title of the Course and Course Code	Computer Applications Project - II (CSA5312)	Number of Credits : 04
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	List and define different problem statements.	1
CO2	Explain different software development life cycle models and approaches to solve the problem of a project.	2
CO3	Apply resource management skills for the project.	3
CO4	Integrate the modules using different techniques and tools.	4
CO5	Decide and draw relevant diagrams related to the concerned problem.	5
CO6	Prepare the solutions through presentations and technical reports for the concerned problem.	6

S. Y. M.Sc. Semester IV

Title of the Course and Course Code	Industrial Training/Institutional Project (CSA5401)	Number of Credits : 08
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the different skills, attitude and knowledge to understand the professionalism in the IT industry.	1
CO2	Discuss the working culture of the Industry in view to maintain quality standards.	2
CO3	Implement the confidence, presentation skills and logical thinking in developing the system.	3
CO4	Differentiate between the academics and professional work culture in timely delivery of projects.	4
CO5	Compare and contrast the professional development of the programs and project.	5
CO6	Combine the techniques to enhance oneself as a thorough software professional.	6