Course Outcomes of Master of Computer Applications (MCA)

First Semester

| Course | Course Type | Course Title | 41 | Loa | d ions | M Distr | arks ibution | Total Morks | Credits |
|---------|--|--|----|-----|-----------|------------|-----------------|----------------|---------|
| Coue | | | L | T | P | Internal | External | IVIALKS | |
| PGCA101 | Core Theory | Information Management | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA102 | Core Theory | Programming Languages | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA103 | Core Theory | Advanced Database Management System | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA104 | Core Theory | Mathematical Foundations of Computer Science | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA105 | Ability Enhancement Compulsory Course (AECC) | Technical Communication | 3 | 0 | 0 | 40 | 60 | 100 | 3 |
| PGCA106 | Core Practical/Laboratory | Information Management Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| PGCA107 | Core Practical/Laboratory | Programming Languages Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| PGCA108 | Core Practical/Laboratory | Advanced Database Management System Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| | TOTAL | | 19 | 0 | 12 | 380 | 420 | 800 | 25 |

Second Semester

| Course | Course Type | Course Title | Load | Alloca | ations | Marks D | istribution | Total | Credit |
|---------|------------------------------|---|------|--------|--------|----------|-------------|-----------|--------|
| Code | | | L | Т | Р | Internal | External | Mark s | S |
| PGCA201 | Core Theory | Advanced Operating System | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA202 | Core Theory | Programming in Python | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA203 | Core Theory | Advanced Software Engineering | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA204 | Core Theory | Data Communication and Networks | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA205 | Core Theory | Advanced Data Structures | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA206 | Core Practical/Laboratory | Advanced Operating System Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| PGCA207 | Core Practical/Laboratory | Programming in Python Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| | TOTAL | | 20 | 0 | 8 | 320 | 380 | 700 | 24 |

| Students will undergo 4 weeks Summer Train | ng after 2nd semester. | Course Code: PGCA-B1 |
|--|------------------------|-----------------------------|
|--|------------------------|-----------------------------|

| Third Semeste |
|---------------|
|---------------|

| Course | Course Type | Course Title | Load | Alloca | tions | Marks D | istribution | Total | Credits |
|---------|------------------------------|--------------------------------|------|--------|-------|----------|-------------|-------|---------|
| Code | | | L | Т | Р | Internal | External | Marks | |
| PGCA301 | Core Theory | Advanced Java | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA302 | Core Theory | Web Technologies | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA303 | Core Theory | E-Commerce | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCAxxx | Elective Theory | Elective-1 | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA304 | Core Practical/Laboratory | Minor Project | 0 | 0 | 4 | 100 | - | 100 | 4 |
| PGCA305 | Core Practical/Laboratory | Advanced Java Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| PGCA306 | Core Practical/Laboratory | Web Technologies Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| | TOTAL | | 16 | 0 | 12 | 380 | 320 | 700 | 24 |

Fourth Semester

| Course | Course Type | ourse Type Course Title Load Alle | | Alloca | tions | Marks Di | Total | Credits | |
|---------|------------------------------|---|----|--------|-------|----------|----------|---------|----|
| Code | | | L | Т | Р | Internal | External | Marks | |
| PGCA401 | Core Theory | Interactive Computer Graphics | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA402 | Core Theory | Object Oriented Analysis & design with UML | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA403 | Core Theory | Cyber Laws and IPR | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCAxxx | Elective Theory | Elective-II | 4 | 0 | 0 | 40 | 60 | 100 | 4 |
| PGCA404 | Core Practical/Laboratory | Major Project | 0 | 0 | 4 | 40 | 60 | 100 | 4 |
| PGCA405 | Core Practical/Laboratory | Interactive Computer Graphics Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| PGCA406 | Core Practical/Laboratory | Object Oriented Analysis & design with UML Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| | TOTAL | | 16 | 0 | 12 | 320 | 380 | 700 | 24 |

List of Elective-I

| Course Code | Course Title |
|--------------------|---------------------------|
| PGCA307 | System Programming |
| PGCA308 | Data Warehousing & Mining |
| PGCA309 | Theory of Computation |

List of Elective-II

| Course Code | Course Title | | | | | | |
|--------------------|-----------------------------------|--|--|--|--|--|--|
| PGCA407 | Cloud Computing | | | | | | |
| PGCA408 | Network Security & Administration | | | | | | |
| PGCA409 | Big Data Analytics | | | | | | |

First Semester

Course Code: PGCA 101 Course Name: Information Management

Course outcomes

CO1: Design, document and develop robust, extensible and highly maintainable dataintensive applications using cutting edge technologies tailored to the specific needs of any business scenario.

CO2: Explain the core aspects of information technology for their implementation in a business.

CO3: Understand and facilitate the strategic and operational benefits of business models and technology applications.

CO4: Apply the information management principles and tools to manage a business.

CO5: Acquire knowledge about various Information Systems.

Course Code: PGCA 102 Course Name: Programming Languages Course outcomes

CO1: Prepare object-oriented design for small/medium scale problems.

CO2: Demonstrate the differences between traditional imperative design and object-oriented design.

CO3: Explain class structures as fundamental, modular building blocks.

CO4: Understand the role of inheritance, polymorphism structures in building code.

CO5: Acquire knowledge of using classes written by other programmers when constructing their systems.

Course Code: PGCA 103

Course Name: Advanced Database Management Systems

Course outcomes

CO1: Express the basic concepts of DBMS and RDBMS.

CO2: Apply normalization theory to the normalization of a database

CO3: Apply the concept of Transaction Management & Recovery techniques in RDBMS.

CO4: Analyze various advanced databases prevailing in market, Big Data, Temporal Databases,

Parallel and Distributed Databases, XML Database and multidimensional Databases

CO5: Demonstrate No SQL databases (Open Source)

Course Code: PGCA 104

Course Name: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course outcomes

CO1: Demonstrate a solid foundation in mathematics which exhibits both breadth and depth of knowledge.

CO2: Understand the role of mathematics in Computer Applications.

CO3: Apply the operations of simple and multi graphs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms

CO4: Apply Algebra of logic, Propositions, Tautologies and contradiction, Equivalence and implication, Principle of Mathematical induction

CO5: Determine if a given graph is simple or a multi graph, directed or undirected, Eulerian and Hamiltonian Graphs, Shortest path algorithm and determine the connectivity of a graph.

Course Code: PGCA 105

Course Name: Technical Communication

Course outcomes

CO1: The objective of the course is to help the students become the independent users of English language.

CO2: Students will acquire basic proficiency in reading & listening, comprehension, writing and speaking skills.

CO3: Students will be able to understand spoken and written English language, particularly the language of their chosen technical field.

CO4: They will be able to converse fluently.

CO5: They will be able to produce on their own clear and coherent texts.

Course Code: PGCA 106

Course Name: Information Management Lab

Course outcomes

CO1: Design data-intensive applications using cutting edge technologies tailored to the specific needs of any business scenario.

CO2: Implement the core aspects of information technology in a business.

CO3: Understand the strategic and operational benefits of business models and technology applications.

CO4: Create the information management principles and tools to manage a business.

CO5: Develop the knowledge for various Information Systems.

Course Code: PGCA 107 Course Name: Programming Languages Lab

Course Outcomes:

- 1. Compare and contrast programming paradigm with procedure oriented programming paradigm.
- 2. Design and implement efficient programs to solve computing problems in a high level programming language.
- 3. Utilize knowledge of different object oriented principles to identify and apply the appropriate techniques in problem solving.
- 4. Apply the knowledge acquired to troubleshoot programming related problems.
- 5. Utilize the knowledge and principles of programming while working in multidisciplinary teams.

Course Code: PGCA 108

Course Name: Advanced Database Management Systems Lab

Course Outcomes

- 1. Understand, analyze and apply common SQL statements including DDL, DML and DCL statements to perform different operations.
- 2. Design different views of tables for different users and to apply embedded and nested queries.
- 3. Design and implement a database for a given problem according to well-known design principles that balance data retrieval performance with data consistency.
- 4. Demonstrate and understand relational algebra in Database which is helpful to design related
- 5. database software components.
- 6. Identify the user requirements from a typical business situation, and to document them.

Second Semester

Course Code: PGCA 201 Course Name: Advanced Operating Systems

Course Outcomes

CO1: Understand the basics of operating systems like kernel, shell, types and views of operating systems.

CO2: Describe the various CPU scheduling algorithms and remove deadlocks. CO3: Explain various memory management techniques and concept of thrashing CO4: Use disk management and disk scheduling algorithms for better utilization of external memory. CO5: Recognize file system interface, protection and security mechanisms.

1.

Course Code: PGCA 202 Course Name: Programming in Python

Course Outcomes

CO1: Familiar with Python environment, data types, operators used in Python.

CO2: Compare and contrast Python with other programming languages.

CO3: Learn the use of control structures and numerous native data types with their Methods.

CO4: Design user defined functions, modules, and packages and exception handling Methods.

CO5: Create and handle files in Python and learn Object Oriented Programming Concepts.

Course Code: PGCA 203

Course Name: Advanced Software Engineering

Course Outcomes

CO1: Plan a software engineering process life cycle, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements.

CO2: Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project.

CO3: Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.

CO4: Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice.

CO5: Able to use modern engineering tools necessary for software project management, time management and software reuse.

Course Code: PGCA 204 Course Name: Data Communication and Networks

Course Outcomes

CO1: Understand basic computer network technology.

CO2: Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

CO3: Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN. CO4: Describe routing and congestion in network layer with routing algorithms and classify IPV4

addressing scheme.

CO5: Discuss the elements and protocols of transport layer

Course Code: PGCA 205

Course Name: Advanced Data Structures

Course Outcomes

CO1: Choose appropriate data structures and algorithms and use it to design solution for a specific problem.

CO2: Execute the operations of hashing to retrieve data from data structure.

CO3: Comprehend and select algorithm design approaches in a problem specific manner.

CO4: Design and analyze programming problem statements.

CO5: Come up with analysis of efficiency and proofs of correctness.

Course Code: PGCA 206

Course Name: Advanced Operating System Lab

Course Outcomes:

CO1: Analyze the services, architectures and principles used in the design of modern operating systems.

CO2: Execute Linux commands for files and directories, creating and viewing files, File comparisons and Disk related commands.

CO3: Utilize the concept of virtualization for creating a virtual machine and installing operating system on virtual machine.

CO4: Demonstrate shell programming by using shell variables and shell keywords for automated system tasks.

CO5: Identify the key characteristics of multiple approaches used for the design and development of the operating system.

Course Code: PGCA 207 Course Name: Programming in Python Lab

Course Outcomes:

CO1: Understand the concept of data structures, python and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data.

CO2: Implement linear and non-linear data structures for processing of ordered or unordered data.

CO3: Analyze various algorithms based on their time and space complexity.

CO4: Implement various control structures and numerous native data types.

CO5: Design user defined functions, modules, and packages and exception handling Methods.

Third Semester

Course Code: PGCA 301 Course Name: Advanced Java

Course Outcomes

CO1: Develop solutions for a range of problems using object-oriented programming.

CO2: Apply divide and conquer strategy to searching and sorting problems using iterative and/or recursive solutions.

CO3: Design and implement simple GUI applications.

CO4: Develop structured programmes for various tasks of moderate complexity and requirements.

CO5: Demonstrate improvement in efficiency of programs using good programming techniques.

Course Code: PGCA 302

Course Name: Web Technologies

Course Outcomes

CO1: Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, Javascript, VBScript, ASP, PHP and protocols in the workings of the web and web applications CO2: Analyze a web project and identify its elements and attributes in comparison to traditional projects.

CO3: Create web pages using HTML, DHTML and Cascading Styles sheets.

CO4: Analyze and build interactive web applications using ASP and ASP.NET.

CO5: Build web applications using PHP, XML documents and XML Schema, and consume web services.

Course Code: PGCA 303 Course Name: E-Commerce

Course Outcomes

CO1: Demonstrate an understanding of the foundations and importance of E-commerce

CO2: Demonstrate an understanding of retailing in E-commerce by analyzing branding and pricing strategies, using and determining the effectiveness of market research and assessing the effects of disintermediation.

CO3: Analyze the impact of E-commerce on business models and strategy.

CO4: Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational

CO5: Discuss legal issues and privacy in E-Commerce.

Course Code: PGCA 307 Course Name: System Programming

Course Outcomes

CO1: Familiarity with basic UNIX OS concepts such as: process, program, process groups, signals, running programs, process control, address space, user and kernel modes, system calls, and context switching.

CO2: Acquire knowledge in file I/O (i.e. open, close, read, write, seek).

CO3: Familiar of using sockets to implement client-server environment.

CO4: Familiar in using thread execution models.

CO5: Understand to handle signals and exceptions within a process and to control processes.

Course Code: PGCA 308 Course Name: Data Warehousing and Data Mining

Course Outcomes

CO1: Design a data mart or data warehouse for any organization

CO2: Develop skills to write queries using DMQL

CO3: Extract knowledge using data mining techniques

CO4: Adapt to new data mining tools

CO5: Explore recent trends in data mining such as web mining, spatial-temporal mining

Course Code: PGCA 309 Course Name: Theory of Computation

Course Outcomes

CO1: Understand the basic concepts of formal languages, automata and grammar types, as well as the use of formal languages and reduction in normal forms.

CO2: Demonstrate the relation between regular expressions, automata, languages and grammar with formal mathematical methods.

CO3: Design push down automata, cellular automata and Turing machines performing tasks of moderate Complexity.

CO4: Analyse the syntax and formal properties, parsing of various grammars such as LL(k) and LR(k).

CO5: Describe the rewriting systems and derivation languages.

Course Code: PGCA 304 Course Name: Minor Project

To provide the hands on experience in analyzing, designing and implementing various projects, students are assigned minor projects based on the languages they have learned so far. Based on the project work a project report should be prepared under the guidance of faculty and submitted to department for evaluation.

Course Code: PGCA 305 Course Name: Advanced Java Lab

Course Outcomes:

CO1: Apply the knowledge of JAVA language syntax and semantics to write and execute Java programs. CO2: Analyze the different aspects of a specific problem and design Java programs based on object oriented principles like classes, objects, constructors and inheritance.

CO3: Using the concept of applets and event handling develop GUI interfaces for a computer program to interact with users and to implement the event based GUI handling principles.

CO4: Identify various erroneous conditions in the system and implement the merits of exception handling techniques to make the system bug free.

CO5: Design Java programs to design a system to meet industrial needs and to solve real world problems based on client-server communication.

Course Code: PGCA 306 Course Name: Web Technologies Lab

Course Outcomes

CO1: Develop XML files using concept of XML DOM, XSLT and XML Namespaces.

CO2: Implement programs to validate the XML Documents with respect to given XML schemas and DTD.

CO3: Develop an interactive website using jQuery or AJAX.

CO4: Develop solution to complex problems using appropriate web services and content management software.

CO5: Develop pages using suitable client side and server side web technologies.

CO6: Design and develop websites using word press software.

Fourth Semester

Course Code: PGCA 401 Course Name: Interactive Computer Graphics

Course Outcomes

CO1: Demonstrate an understanding of contemporary graphics hardware.

CO2: Create interactive graphics applications in C++ using one or more graphics application programming interfaces.

CO3: Functions to implement graphics primitives.

CO4: Demonstrate geometrical transformations.

CO5: Demonstrate an understanding of the use of object hierarchy in graphics applications.

Course Code: PGCA 402

Course Name: Object Oriented Analysis and Design using UML

Course Outcomes

CO1: Understand the fundamental principles of OO programming.

CO2: Master key principles in OO analysis, design, and development.

CO3: Familiar to the application of the Unified Modeling Language (UML) towards analysis and design.

CO4: Master common patterns in OO design and implement them

CO5: Familiar with alternative development processes

Course Code: PGCA 403

Course Name: Cyber Laws and IPR

Course Outcomes

CO1: Acquire knowledge about various Information Systems.

CO2: Understand the key security requirements of Confidentiality, Integrity

&Availability. CO3: Demonstrate the concept of Intrusion Detection & Intrusion Prevention.

CO4: Apply Symmetric Encryption techniques.

CO5: Describe the concept of Security policies and Cyber Laws.

Course Code: PGCA 407 Course Name:Cloud Computing

Course Outcomes

CO1: Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics.

CO2: Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost.

CO3: Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.

CO4: Analyze various cloud programming models and apply them to solve problems on the cloud.

CO5: Understand the advantages and challenges brought about by the various models and services in cloud computing.

Course Code: PGCA 408 Course Name: Network Security & Administration

Course Outcomes

CO1: Undertake routine tasks to secure a network.

CO2: Understand the factors that place an internet-based information system at risk

CO3: Evaluate procedures to secure a system against failure, theft, invasion and sabotage.

CO4: Understand and apply the concepts for administrating a small company's network.

CO5: Apply knowledge to simple case studies to implement network security.

Course Code: PGCA 409 Course Name: Big Data Analytics

Course Outcomes

CO1: Apply knowledge of statistics, science and programming skills, to solve of complex analytical problems related to big data and business analytics.

CO2: Identify, formulate, and analyze business analytical problems concerning and demanding big data.

CO3: Design and evaluate fully distributed model of big data to solve real time problems.

CO4: Make use of research-based knowledge to identify the appropriate data collection methods, apply statistical methods to analyze, synthesis and interpretation of data, to provide valid conclusions.

CO5: Function in multi-disciplinary teams through groups while working on mini-project concerning business analytical problems.

Course Code: PGCA 404 Course Name: Major Project

To provide the hands on experience in analyzing, designing and implementing various projects, students are assigned major projects based on the languages they have learned so far. Based on the project work a project report should be prepared under the guidance of faculty and submitted to department for evaluation.

Course Code: PGCA 405 Course Name: Interactive Computer Graphics Lab

Course Outcomes

CO1: Understand the structure of modern computer graphics.
CO2: Develop and design drawings that demonstrate computer graphics and design skills.
CO3: Make use of the key algorithms for modeling and rendering graphical data.
CO4: Develop, design and problem solving skills with application to computer graphics.
CO5: Creating programs in C++ to implement various graphical features like clipping, filling etc.

Course Code: PGCA 406

Course Name: Object Oriented Analysis & Design with UML Lab

Course Outcomes:

- 1. Identify the fundamental principles of OO programming.
- 2. Understand key principles in OO analysis, design, and development.
- 3. Analyze the application of the Unified Modeling Language (UML) towards analysis and design.
- 4. Implement the common patterns in OO design
- 5. Understand the alternative development processes