MASTER OF COMPUTER APPLICATIONS

CURRICULUM AND SYLLABUS

(For students admitted from the Academic year 2022-2023)

UNDER CHOICE BASED CREDIT SYSTEM

[Regulations 2022]

DIRECTORATE OF DISTANCE EDUCATION

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

SRM NAGAR, KATTANKULATHUR – 603 203

DIRECTORATE OF DISTANCE EDUCATION

MASTER OF COMPUTER APPLICATIONS
(For students admitted from the academic year 2022-2023)

CURRICULUM

SEMESER - II

Category	Course Code	Course Title	L	T	P	Total LTP	C
Compulsory Core1	MCAD2221	Python Programming	3	0	4	7	5
	MCAD2222	Software Engineering and Software Testing	3	1	0	4	4
	MCAD2223	Data Mining and Data Warehousing	3	1	0	4	4
Student Must Select any one of the following Core Courses							
Choice Based Core 1	MCAD2224	Advanced Java Programming	3	0	4	7	5
	MCAD2225	Web programming using ASP.NET					
Supportive Course	MCAD2226	Data Analysis Using R	0	1	2	3	2
		Total	**12**	**3**	**10**	**25**	**20**

SEMESTER – II

Course Code	Course Title	L	T	P	Total LTP	C
MCAD2221	**PYTHON PROGRAMMING**	**3**	**0**	**4**	**7**	**5**

	INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:	**Student Outcomes**				
1.	To understand the principles and concepts of Python	a				
2.	To learn System tools, OS and Sys modules		a			
3.	To enable the learner to pursue careers in Socket Programming		e	l		k

UNIT -1: INTRODUCTION TO PYTHON

Python Interpreter and its working, Syntax and Semantics, Data Types, Assignments, Expressions, Control Flow Statements, Sequences, Dictionaries, Functions and lambda expressions

UNIT - 2: ITERATIONS AND COMPREHENSIONS

Handling text files Modules, Classes, OOP Exception Handling, Exception Handling Strings, Regular Expressions, try statement in Python, User-Defined Exception in Python, Use of Inheritance in Python

UNIT - 3: SYSTEM TOOLS

OS and Sys modules, Directory Traversal tools, Parallel System tools, threading and queue, Program Exits, system interfaces by focusing on tools and techniques, binary files, tree walkers, Python's library support for running programs in parallel.

UNIT -4: SOCKET PROGRAMMING

Handling Multiple Clients, Client-side scripting, urlibServer Side Scripting, CGI Scripts with User Interaction, Passing Parameters, XML Parser Architectures and APIs, Parsing XML with SAX APIs, The parse Method

UNIT - 5: INTRODUCTION TO TKINTER

Top Level Windows, Dialogs, Message and Entry, Event handling, Menus, List boxes and Scrollbars, Text, SQL Database interfaces with sqlite3, Basic operations and table load scripts, SQLite database from your Python program, Design and implement basic applications

TEXT BOOKS

1. Mark Lutz ,"Learning Python", O Reily, 4thEdition, 2009, ISBN: 978-0-596-15806-4.

REFEENCE:

1. Mark Lutz ,"Programming Python ", O Reily, 4thEdition, 2010, ISBN 9780596158118
2. Tim Hall and J-P Stacey ,"Python 3 for Absolute Beginners" , 2009, ISBN:9781430216322
3. Magnus Lie Hetland , "Beginning Python: From Novice to Professional", 2nd Edition, 2009, ISBN:9781590599822.

Course Nature: Theory-Cum-Practical						
Assessment Method(Maximum marks)						
In Semester	Assessment Tool	Practical exercises -I		Practical exercises -II		Total
		Theory	Practical	Theory	Practical	
		10	5	10	5	
	Total	**15**		**15**		**30**
End Semester	Marks	Theory			Practical	**70**
		40			**30**	
					Total	**100**

Course Code	**Course Title**	**L**	**T**	**P**	**Total LTP**	**C**
MCAD2222	**SOFTWARE ENGINEERING AND SOFTWARE TESTING**	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		**Student Outcomes**				
1.	To classify the various Software Process Models	A		l		
2.	To understand the Software Testing Concepts.		e			
3.	To implement the Software Quality and Control Concepts		b			j
4.	To Design the Test cases and to get familiarity over Automated Testing tools	A				j

UNIT I - THE PRODUCT AND THE PROCESS

The Evolving Role of Software– Software Characteristics– Software Applications– Software: A Crisis on the Horizon?- Software Myths- Software Engineering: A Layered Technology– The Software Process– Software

Process Models– The Linear Sequential Model– The Prototyping Model- The RAD Model- Evolutionary Software Process Models- Component-Based Development.

UNIT II - SYSTEM ENGINEERING AND ANALYSIS CONCEPTS

Computer-Based Systems– The System Engineering Hierarchy – Business Process Engineering: An Overview– Product Engineering: An Overview– Requirements Engineering– System Modeling– Requirement Analysis- Requirements Elicitation for Software- Software Prototyping- Specification- Specification Review.

UNIT III PRINCIPLES OF TESTING

PRINCIPLES OF TESTING: Introduction - Phases of software – Quality assurance and Quality control - Testing verification and validation - TECHNIQUES: White box - static testing - structural testing - challenges in white box testing - Black box testing.

UNIT IV - TYPES OF TESTING

TYPES OF TESTING: Integration testing - Top-Down Integration – Bottomupintegration-Bi-Directional Integration - System - Integration – SYSTEM ACCEPTANCE TESTING: Functional versus Non Functional Testing - Functional System Testing - Non Functional Testing Acceptance Testing.

UNIT V - PERFORMANCE TESTING

PERFORMANCE TESTING: Introduction - Factors of governing - performance testing - Methodology for performance testing - Tools for performance testing - Process for performance Testing – REGRESSION TESTING : Introduction - Types regression testing - Best pratice in regression testing.

TEXT BOOKS

1. Roger S. Pressman, (2001), "*Software Engineering* ", Fifth edition, McGraw-Hill Higher Education - A Division of The McGraw-Hill Companies.
2. Srinivasan Desikan and Gopalasamy Ramesh, "*Software Testing for Principles and Practices*", Person Education,.

REFERENCES

1. William E. Perry (2006), "*Effective Methods of Software Testing*", 3rd Ed, Wiley India.
2. RenuRajani, Pradeep Oak (2007), *"Software Testing"*, TMH.

Course Nature: Theory				
Assessment Method(Maximum marks)				
In Semester	Assessment Tool	Assignment I	Assignment II	Total
	Marks	15	15	30
End Semester				70
Total				100

Course Code	Course Title	L	T	P	Total LTP	C
MCAD2223	DATA MINING AND DATA WAREHOUSING	3	1	0	4	4

	INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:	Student Outcomes				
1.	To impart knowledge about Data Mining	a				
2.	To know about various techniques used in Data Mining	b				
3.	To design data warehouses for the companies		c			
4.	To enable the learner for aiming careers in Data Warehouse Management			l	g	k

UNIT I - DATA MINING CONCEPTS & ARCHITECTURE

Introduction – Data Mining Definitions, Tools, Applications - Data Mining - Learning: Definition, Anatomy of Data Mining.Types of Knowledge – Knowledge Discovery Process- introduction, Evaluation,Stages, Operations and Architecture of Data Mining.

UNIT II - DATA MINING TECHNIQUES

Visualization Techniques – Likelihood & distance-Neural Networks-Decision Tree technique-Constructing decision trees-ID3 algorithm-Genetic algorithms: Crossover & mutation -Clustering: Distance function-K-means algorithm -Hierarchical Clustering - Association rules: Apriori algorithm – Real Time Applications and Future Scope.

UNIT III - DATA WAREHOUSING CONCEPTS & ARCHITECTURE

Introduction –Goals- Process Architecture- Load Manager-Warehouse Manager-Query Manager - DWH Objects - Fact table & Dimension table –DWH Users - Data Warehouse Schemas: Star schemas-Snowflake Schemas.

UNIT IV - DATA WAREHOUSE PARTITIONING & AGGREGATION

Horizontal Partitioning-Vertical Partitioning-Hardware Partitioning-Software partitioning Methods-Aggregation-Designing Summary tables-Designing Summary tables

UNIT V - DATA MARTS, META DATA, BACKUP & RECOVERY

Data Marts: Introduction-Estimating Design – Cost-Meta Data-Backup: Types of backup-Backup the data warehouse – SureWest Online Backup-Recovery: Strategies-various Testing Strategies-Various Recovery models, Disaster Recovery procedure

TEXT BOOKS

1. PrabhuS, Venkatesan N(2006), Data Mining & Warehousing – New Age International – First Edition, New Delhi (For Units 1 & 2).
2. Sam Anahory, Dennis Murray (2004), Data warehousing in real world – Pearson Education, New Delhi (For Units 3, 4 & 5).

REFERENCES

1. Pieter Adriaans, DolfZantinge (2005), Data Mining – Pearson education, New Delhi.
2. Alex Berson, Stephen J Smith (2004), Data Warehousing, Data mining & OLAP – Tata McGraw Hill Publications, New Delhi.

Course Nature: Theory				
Assessment Method(Maximum marks)				
In Semester	Assessment Tool	Assignment I	Assignment II	Total
	Marks	15	15	30
End Semester				70
Total				100

Course Code	**Course Title**	**L**	**T**	**P**	**Total LTP**	**C**
MCAD2224	**ADVANCED JAVA PROGRAMMING**	**3**	**0**	**4**	**7**	**5**

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		**Student Outcomes**				
1.	To understand the principles and concepts of Advance object programming	a				
2.	To learn Multi-Tier Apllication Development		a			
3.	To enable the learner to pursue careers in enterprise applications and framework		e	l		k

UNIT I JAVA GUI PROGRAMMING (9 Hours)

Basics of Swings – Swing Components - Containers and Frames –Layout Manager, Menus and Toolbars - Event Handling.

UNIT II J2EE CONCEPTS (9Hours)

Java EE 5 Platform Overview- Distributed Multi-tiered Applications- Web & Business Components-Java EE Containers – services & types- Java EE Application Assembly & Deployment – Packaging Applications, Java EE modules- Getting Started with Web applications- Model View Controller (MVC)2 Architecture & Packaging – Web application deployment descriptor (web.xml file)- Web Application Archive (*.WAR file) -Ant build tool.

UNIT III APPLICATIONS IN DISTRIBUTED ENVIRONMENT (9 Hours)

Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI- IIOP implementation – CORBA – IDL technology – Naming Services – CORBA programming Models - JAR file creation.

UNIT IV MULTI-TIER APPLICATION DEVELOPMENT (9 Hours)

Server-side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication - JDBC – Applications on databases -Prepared Statements - Creating Prepared Statement object- Assign values for Prepared Statement parametersMultimedia streaming applications – Java Media Framework- XML Introductions

UNIT V ENTERPRISE APPLICATIONS AND FRAMEWORK (9 Hours)

Server Side Component Architecture –EJB Introduction-EJB Architecture- Session Beans – Entity Beans – Persistent Entity Beans –Java Frameworks-Strut introduction-HIBERNATE

TEXT BOOKS:

1. Eric Armstrong, Jennifer Ball, Stephanie Bodoff ―J2EE The Complete Reference‖ 2005. (UNIT II)

2. Ed Roman, ―Mastering Enterprise Java Beans‖, John Wiley & Sons Inc., 1999.

(UNIT III and UNIT V)

3. Hortsmann& Cornell, ―CORE JAVA 2 ADVANCED FEATURES, VOL II‖, Pearson

Education, 2002. (UNIT I and UNIT IV)

4. Mowbray, ―Inside CORBA‖, Pearson Education, 2003.(Unit III)

REFERENCES:

1. Web reference: http://java.sun.com.

2. Patrick Naughton, ―COMPLETE REFERENCE: JAVA2‖, Tata McGraw-Hill, 2003.

Course Nature: Theory-Cum-Practical						
Assessment Method(Maximum marks)						
In Semester	Assessment Tool	Practical exercises -I		Practical exercises -II		Total
		Theory	Practical	Theory	Practical	
		10	5	10	5	
	Total	**15**		**15**		**30**
End Semester	Marks	Theory			Practical	**70**
		40			**30**	
					Total	**100**

Course Code	Course Title	L	T	P	Total LTP	C
MCAD2225	**WEB PROGRAMMING USING ASP.NET**	**3**	**0**	**4**	**7**	**5**

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		**Student Outcomes**				
1.	To develop simple web form using various controls and implement the concept ofmaster page	a				
2.	To Explain the architecture of Dot Net platform	b				
3.	To develop interaction of front end with database using facilities of .NET platform		c			
4.	To deploy .Net Web Applications			l	g	K

UNIT – I INTRODUCTION TO .NET FRAMEWORK AND ASP.NET

State the components of Framework and describe CLR, Microsoft .NET framework, Overview, Net framework Architecture, Net Framework components: (CLR, CLS, CTS, MSIL, NameSpace, JIT, Metadata, FCL, Assembly, GAC, GC,Memory Management), Explain benefits of ASP.NET over Classic ASP and also the Client-Server architecture. Basics of ASP.NET, Features of ASP.NET, Differences between ASP.NET and Classic ASP, Develop applications using ASP.NET IDE, Creating simple Web Application in ASP.NET, Introduction to Visual Studio 2008, Creating a New Web Project (ASP.NET), Opening an Existing Web Site, Building Web Sites, Set up of work environment, start page, the menu system, toolbars, the new project dialog box, graphical designer, code designer.

UNIT – II ASP.NET WEB FORMS

Develop simple web page using built in Objects, Adding Controls to the Web Page, Types of ASP.NET Files, Page Life Cycle, Web Form Processing Stages(Roundtrip), ASP.Net In-Built Objects, Use controls available with the IDE platform of ASP.NET for given purpose. Web Server Controls (Button, Check Box, Check Box List, Drop Down List, HyperLink, Image, Image Button, Label, Link Button, List Box, List Item, Panel, Place Holder, Radio Button, Radio Button List, TextBox), Working with Control Properties and Events, Validation Controls (Required Field Validator, RangeValidator Control, Compare Validator, RegularExpression Validator, CustomValidator, Validation Summary)

UNIT – III STYLES, THEMES AND MASTER PAGES

Apply Styles, themes and Master pages in ASP.NET Web applications, Styles, Creating Style Sheets, Applying Style Sheet Rules, Themes, How Themes Work, Handling Theme Conflicts, Creating Multiple Skins for the Same Control, Master Page, Basics of Master page, How Master page and Content pages are connected, Nesting Master Pages.

UNIT -IV ASP.NET STATE MANAGEMENT

Develop programs using session management and user's preference in ASP.NET, State Management, View State, The Query String, Cross-Page Posting and Validation, Cookies (create, set, add and expire cookie),

Session State, Application State, The Global.asax application file, Application Events, ASP.NET Configuration, The Web.config File, Storing Custom Settings in the web.config File

UNIT - V CONNECTING DATABASE USING ADO.NET

Describe Objects of ADO.NET, Describe the use of Data Binding to bind different, ADO.NET Architecture, DataProvider, Connection Object, Command Object, DataReader Object, Differentiate between single value and repeated value types of data binding, DataAdapter Object, DataSet, DataView, Data Binding, Types of data binding (Single Value, Repeated Value), SQL Data Source, Selecting, Updating and Deleting Records

TEXT BOOK:

1. ASP.NET: The Complete Reference Books, Matthew Macdonald, McGraw Hill education

REFERENCES:

1. Programming in Visual Basic .NET, Julia Case Bradley, Anita C. Millspaugh, McGraw Hill, latest edition
2. Visual Basic .net Comprehensive Concepts and Techniques, Shelly, cashman, Quasney, Cengage learning, 2012

Course Nature: Theory-Cum-Practical						
Assessment Method(Maximum marks)						
In Semester	Assessment Tool	Practical exercises -I		Practical exercises -II		Total
		Theory	Practical	Theory	Practical	
		10	5	10	5	
	Total	**15**		**15**		**30**
End Semester	Marks	Theory			Practical	**70**
		40			**30**	
					Total	**100**

Course Code	**Course Title**	**L**	**T**	**P**	**Total LTP**	**C**
MCAD2226	**DATA ANALYSIS USING R**	**0**	**1**	**2**	**3**	**2**

INSTRUCTIONAL OBJECTIVES At the end of this course the learner is expected:		**Student Outcomes**				
1.	To understand the principles and concepts of Data Science	a				
2.	To learn Working with R Programming		a			
3.	To enable the learner to pursue careers in Data Visualization in R		e	l		k

UNIT 1: INTRODUCTION TO DATA SCIENCE

What is Data Science, Scenarios on Data Science, Data Science and Organization, Different types of data, Structured data, Unstructured data, Machine generated data, Understanding on Data Science Process, Explain on

Research Goal, Data Processing on Data Science, Getting Start With R, Overview of R, Why R for Data Science, Eclipse, Live-R, Project Workspace Setup, Understanding on R Packages, Load Libraries and Installed Packages.

UNIT 2: WORKING WITH R PROGRAMMING

Data Types and Syntax, Processing on Variables, Data Items on Structure, Classes and Manipulate Objects, Control statements IF, ELSE, SWITCH, Loop statements, FOR, WHILE, REPEAT, Working with String and Date, Understanding on Vector, List, Data Frames, Working with Arrays, Read and Write data from CSV, Tabular Data and Database.

UNIT 3: CLASSIFICATION IN R

Classification - Introduction, Types of Classification, Application of Classification, Overview of DT, Naïve Bayes, KNN, Random forest, Introduction – DT, DT Algorithm, Example of DT with R, Introduction – Naïve bayes, Naïve Bayes Algorithm, , Example of Naïve Bayes with R, Introduction - KNN, KNN Algorithm, Example of KNN with R, Introduction – Random Forest, Random Forest Algorithm, Example of Random Forest with R.

UNIT 4: CLUSTERING IN R

Clustering - introduction, Types of Clustering, Application of Clustering, Overview of K-means, Hierarchical, Medoids, DBSCAN, Packages, Introduction – K-means, K-means Algorithm, Example of K-means with R, Introduction – Hierarchical, Hierarchical Algorithm, Example of Hierarchical with R

UNIT 5: DATA VISUALIZATION IN R

Overview of Data Visualization, Packages, Interactive Graphics, Plotting, Scatter plot , Box plot, Bar plot, Pie chart, Histogram, XKD-Style Plots, Heat Maps, Introduction to predictive models, What is Model and how to build a model.

TEXTBOOK:

1. R for Data Science by Hadley Wickham
2. Introduction to Data Science, R. Irizarry

REFERENCE:

1. R Programming for Data Science, Roger D Peng
2. Data Visualization: A practical introduction, by Kieran Healy

<table>
<tr><td colspan="7">Course Nature: Theory-Cum-Practical</td></tr>
<tr><td colspan="7">Assessment Method(Maximum marks)</td></tr>
<tr><td rowspan="3">In Semester</td><td rowspan="3">Assessment Tool</td><td colspan="2">Practical exercises -I</td><td colspan="2">Practical exercises -II</td><td rowspan="3">Total</td></tr>
<tr><td>Theory</td><td>Practical</td><td>Theory</td><td>Practical</td></tr>
<tr><td>10</td><td>5</td><td>10</td><td>5</td></tr>
<tr><td></td><td>Total</td><td colspan="2">15</td><td colspan="2">15</td><td>30</td></tr>
<tr><td rowspan="2">End Semester</td><td rowspan="2">Marks</td><td colspan="3">Theory</td><td>Practical</td><td rowspan="2">70</td></tr>
<tr><td colspan="3">40</td><td>30</td></tr>
<tr><td colspan="6">Total</td><td>100</td></tr>
</table>