

**SONA COLLEGE OF TECHNOLOGY, SALEM-5**

**(An Autonomous Institution)**

**Master of Computer Applications**

**CURRICULUM and SYLLABI**

**[For students admitted in 2018-2019]**

**MCA Regulation 2018**

**Approved by BOS and Academic Council meetings**

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for MCA III Semester under Regulations 2018**  
**Branch: Master of Computer Applications**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>Theory</b>						
1	P18MCA301	Object Oriented Programming in Java	3	0	0	3
2	P18MCA302	Operating Systems	3	0	0	3
3	P18MCA303	Data Base Design and Programming with SQL	3	0	0	3
4	P18MCA304	Advanced Data Structures, Algorithms, and Analysis	3	0	0	3
5	P18MCA305	Data Communication and Networking	3	0	0	3
<b>Practical</b>						
6	P18MCA306	Java Programming Laboratory	0	0	4	2
7	P18MCA307	Data Base Design and Programming with SQL Laboratory	0	0	4	2
8	P18MCA308	Advanced Data Structures, Algorithms Laboratory	0	0	4	2
9	P18MCA309	Soft Skill Development Laboratory - III	0	0	2	1
<b>Total Credits</b>						<b>22</b>

Approved by

**Chairman, MCA BOS**  
**Dr.T. Padma**

**Member Secretary, Academic Council**  
**Dr.R.Shivakumar**

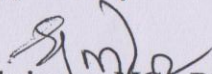
**Chairperson, Academic Council & Principal**  
**Dr.S.R.R.Senthil Kumar**

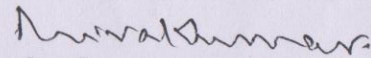
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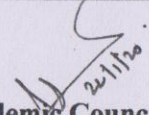
Sona College of Technology, Salem  
(An Autonomous Institution)  
Courses of Study for MCA IV Semester under Regulations 2018  
Branch: Master of Computer Applications

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>Theory</b>						
1	P18MCA401	Web Technology	3	0	0	3
2	P18MCA402	Mobile Application Development	3	0	0	3
3	P18MCA403	Python Programming	3	0	0	3
4	P18MCA723	Elective - Internet of Things	3	0	0	3
5	P18MCA711	Elective - User Interface Design	3	0	0	3
	P18MCA713	Elective - Business Intelligence				
6	P18MCA705	Elective - Artificial Intelligence	3	0	0	3
	P18MCA722	Elective - Green Computing				
<b>Practical</b>						
7	P18MCA404	Web Technology Laboratory	0	0	4	2
8	P18MCA405	Mobile Application Development Laboratory	0	0	4	2
9	P18MCA406	Python Programming Laboratory	0	0	4	2
10	P18MCA407	Soft Skill and Aptitude Career Enhancement Laboratory - IV	0	0	2	1
<b>Total Credits</b>						<b>25</b>

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Sona College of Technology, Salem  
(An Autonomous Institution)  
Courses of Study for MCA V Semester under Regulations 2018  
Branch: Master of Computer Application

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>THEORY</b>						
1	P18MCA501	Cloud Computing	3	0	0	3
2	P18MCA502	C# and .NET Programming	3	0	0	3
3	P18MCA503	Software Testing	3	0	0	3
4	P18MCA731	Elective - R Programming	3	0	0	3
5	P18MCA734	Elective - Object Oriented Analysis and Design	3	0	0	3
6	P18MCA724	Elective - Cyber Security	3	0	0	3
	P18MCA726	Elective - PHP Programming				
<b>PRACTICAL</b>						
7	P18MCA504	Cloud Computing Laboratory	0	0	4	2
8	P18MCA505	C# and .NET Programming Laboratory	0	0	4	2
9	P18MCA506	Mini Project Laboratory	0	0	4	2
10	P18MCA507	Soft Skills and Aptitude Career Enhancement Laboratory V	0	0	2	1
<b>Total Credits</b>						<b>25</b>

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28.05.2020

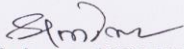
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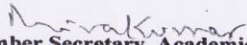


Sona College of Technology, Salem  
(An Autonomous Institution)  
Courses of Study for MCA VI Semester under Regulations 2018  
Branch: Master of Computer Application

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>THEORY</b>						
1	P18MCA707 ✓	Elective - E- Learning Techniques ✓	3	0	0	3 ✓
	P18MCA717 ✓	Elective - Software Project Management ✓				
<b>PRACTICAL</b>						
2	P18MCA601 ✓	Project Work ✓	0	0	12	6 ✓
<b>Total Credits</b>						<b>9 ✓</b>

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13.01.2021

Regulations-2018

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for MCA III Semester under Regulations 2018**  
**Branch: Master of Computer Applications**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>Theory</b>						
1	P18MCA301	Object Oriented Programming in Java	3	0	0	3
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3	P18MCA303	Data Base Design and Programming with SQL	3	0	0	3
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<b>Practical</b>						
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<b>Total Credits</b>						<b>22</b>

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## P18MCA301 - OBJECT ORIENTED PROGRAMMING IN JAVA

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES

This course will enable the student to:

- Understand the fundamentals of OOPS programming and Java Programming.
- Be familiar with the fundamental programming of java.
- Gain knowledge on the implementation of OOP with Java.
- Appraise the programming techniques of Java.
- Acquire knowledge in Java utilities.

### UNIT I - INTRODUCTION

9

Introduction to OOP concept - Evolution of Higher Level Languages - The General Topology of Object Based and Objects Oriented Language - Complexity of Software and Their Attributes - Object Orientated Programming Paradigm- Basic Principles of Object Oriented Programming- Advantages of Object Oriented Programming - Applications of Object Oriented Programming - Object Oriented Programming Languages- Introduction to Core Java - Evolution of Java - Salient Features of Java Language- JAVA, Internet and World Wide Web- The Java Environment.

### UNIT II - JAVA FUNDAMENTAL PROGRAMMING

9

Java Language Preliminaries - Keywords and Identifiers - Constants- Numeric Constants - Character Constants-Variables- Data Types- Console I/O- Structure of a Java Program-Sample Program-Executing a Java program- Operators and Expressions - Selection - The Simple if Statement- The If-Else Statement-The nested if-else Statement-The else-if Ladder - The Switch Statement -Nested Switch Statement-Iteration - The while loop- The for loop- Variations of for Loop- The Do-While loop- Which loop to use when?- Jumps in loops- Nesting of Loops- Jumps in Nested Loops- Labeled Loops.

### UNIT III - OOP USING JAVA

9

Classes, Objects and Methods - Declaration and Creation of Objects, Accessing Members-Classification of Member Methods- Constructors- Constructors with and without Arguments-Copy Constructors- The this keyword - Passing Objects to Methods as Arguments-Methods Returning an Object - Static Member Data- Static Member Methods-Static Blocks-Nesting of Member Methods- Recursion- Nested Classes- Non-static Nested Classes or Inner Classes -Static Nested Classes- Local Classes-Anonymous Classes- Final members- Variable Arguments- Objects of one class as instance variables of another class (Containment)- Garbage Collection and Finalize Method- Inheritance - Interfaces - Packages - Classification of Packages - Creating and Using a Package - Access Control

### UNIT IV - JAVA PROGRAMMING TECHNIQUES

9

Arrays - One-dimensional Arrays - Multi-dimensional Arrays- Two-dimensional Arrays (2-D arrays)- Arrays and Methods- Arrays as Arguments to Methods- String Handling - The String Class - The StringBuffer Class- Exception Handling - Multithreaded Programming - The Life Cycle of a Thread - The Thread Class -Thread Priorities - Synchronisation- Deadlock-File Handling- I/O Stream Classes related to File Handling- The Character Stream Classes- The Byte Stream Classes-Mixed Data I/O Streams- Object I/O Streams- Random Access File

### UNIT V - JAVA UTILITIES

9

Applets - The Life Cycle of an Applet- Creating and Executing an Applet-Introduction to

AWT - AWT Hierarchy -- Event Handling- AWT Controls- AWT Window-Level Controls- Windows- Handling Keyboard Events- Handling Mouse Events-Inner Classes-Anonymous Inner Classes- Basic Utility Classes - The Wrapper Classes - The Number Class- The Byte Class- The Short Class- The Integer Class-The Long Class-The Float Class- The Double Class-The Character Class- The Boolean Class

**TOTAL = 45 Hours**

### **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Discuss the fundamentals concepts of OOPS and Java Programming
- Create simple programs that illustrate the fundamental programming of JAVA.
- Demonstrate programs in java that uses OOP.
- Develop programs that illustrates various programming techniques of JAVA.
- Apply Java utilities in the given scenario.

### **REFERENCES**

1. **M. T. Somashekara, D. S. Guru,"Object oriented programming with Java" , PHI Learning (2017)(Unit 1,2,3,4,5)**
2. Raj Buyya," Object oriented programming with Java", McGraw Hill Education,2009
3. D.Lee, Danny C.CPoo, Derek B K Kiong," Object-Oriented Programming and Java ",Springer, 1998
4. Herbert Schildt, "Java A Beginner's Guide- Create, Compile and Run Java Programs Today", Sixth Edition, Oracle Press, 2014.
5. Paul Deitel, Harvey Deitel, "Java How to Program", 9thEdition, Prentice Hall, 2012.
6. Ken Arnold, James Gosling, "The Java Programming Language", Fourth Edition, Addison Wesley, 2005.
7. "Java 6 Programming Black Book", Kogent Solution Inc, Dreamtech Press, 2007.
8. Cay S. Horstmann, Gary Cornell, "Core Java Volume I - Fundamentals", 9<sup>th</sup> Edition, PHI, 2008.
9. E. Balagurusamy, "Programming with Java 3e - A Primer", Tata McGraw Hill, 3<sup>rd</sup> Edition, 2007.
10. Herbert Schildt, "The complete Reference Java", 7<sup>th</sup> Edition, Tata McGraw Hill, 2007.



## P18MCA302 - OPERATING SYSTEMS

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

**This course will enable the student to:**

- Describe the basic organization of computer systems.
- Understand inter process communication using shared memory and message passing.
- Gain knowledge about CPU scheduling and the basis for multi programmed operating systems.
- Provide a detailed description of various ways of organizing memory hardware.
- Know the performance and characteristics of mass-storage devices

### UNIT I - INTRODUCTION & SYSTEM STRUCTURES

9

What Operating Systems Do - Computer System Organization- Computer System Architecture: Operating System Services- System Calls - Types of System Calls - System Programs - Operating System Structure - System Boot.

### UNIT II - PROCESS MANAGEMENT

9

Process Concept- Process Scheduling- Operations on Processes- Inter process Communication- Multicore Programming- Multithreading Models- Implicit Threading- Threading Issues- The Critical Section Problem- Semaphores- Classic Problems of Synchronization.

### UNIT III - CPU SCHEDULING & DEADLOCKS

9

CPU Scheduling: Basic Concepts - Scheduling Criteria- Scheduling Algorithms- Thread Scheduling- Multiple Processor Scheduling- Real-Time CPU Scheduling. Deadlocks: System Model- Deadlock Characterization- Methods for Handling Deadlocks- Deadlock Prevention- Deadlock Avoidance- Deadlock Detection- Recovery from Deadlock.

### UNIT IV - MEMORY MANAGEMENT

9

Main Memory: Background- Swapping- Contiguous Memory Allocation- Segmentation- Paging. Virtual memory : Background- Demand Paging- Copy-on-Write- Page Replacement- Allocation of Frames- Thrashing.

### UNIT V - STORAGE MANAGEMENT

9

Mass-Storage Structure: Overview of Mass Storage Structure- Disk Structure- Disk Attachment- Disk Scheduling- Disk Management- Swap-Space Management- RAID Structure. File System Interface:File Concept- Access Methods- Directory and Disk Structure- File System Mounting- File Sharing- Protection. File System Implementation:File System Structure- File System Implementation- Directory Implementation- Allocation Methods - Free Space Management- Efficiency and Performance- Recovery.

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**COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Explain the fundamental concepts of operating system services and system calls
- Analyze the issues and use of locks, semaphores and monitors for synchronizing multithreaded systems and implement them in multithreaded programs.
- Describe the concepts of deadlock in operating systems and how they can be managed / avoided.
- Implement memory management techniques.
- Apply the algorithms in secondary storage and file management techniques

**REFERENCES**

1. **Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012. (All five units)**
2. G. Coulouris, J. Dollimore, and T. Kindberg, "Distributed Systems: Concepts & Design", Fifth edition, Addison-Wesley, 2012.
3. William Stallings, "Operating Systems: Internals and Design Principles", Prentice Hall, 7<sup>th</sup>Edition, 2011.
4. Andrew S. Tanenbaum& Maarten van Steen, "Distributed Systems: Principles and Paradigms", Prentice-Hall, Second Edition, 2006.
5. MukeshSinghal and N. G. Shivaratri, "Advanced Concepts in Operating Systems", McGraw-Hill, 1<sup>st</sup> Edition, 2001.

## P18MCA303 - DATABASE DESIGN AND PROGRAMMING WITH SQL

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Understand the basis of relational databases and learn how to retrieve and manipulate data from one or more tables.
- Manipulate data with subqueries and aggregate functions.
- Apply views and joins to manage database.
- Demonstrate stored procedures and triggers
- Work with various databases and create reports

### UNIT I - DESIGNING AND CONSTRUCTING A DATABASE 9

**Database design:** database structure, design process, pre-design phase of design, organizing your data, functional dependency and candidate keys, entity-relational modeling, normalization.

**Creating databases:** creating a database, choosing which database to access, creating a table, relational data types, specifying keys, column constraints, default values, Design of the movie info database, indexes.

**Creating, changing and removing records:** preparing data, INSERT statement, SELECT and INSERT together, DELETE statement, UPDATE statement, TRUNCATE statement, DROP statement, ALTER statement.

### UNIT II - RETRIEVING DATA FROM A DATABASE 9

**SELECT statement:** anatomy of a SELECT statement, specifying columns to retrieve, performing calculations on selected data, Using AS to name columns and expressions, Filtering query results using the WHERE clause, dealing with Null Values, Sorting Query Results, how the equality of string is determined.

**Using WHERE Clause:** using logical operators in the WHERE clause, the IN clause, The BETWEEN Clause, Matching parts of strings using LIKE, useful functions for WHERE clauses. **Aggregating query results:** Selecting Unique values using DISTINCT, aggregate functions, COUNT() function, SUM() and AVG() function, dividing aggregates into categories, Filtering query results using HAVING.

**combining Tables using Joins:** joins and Normalization, what is a Join, Using Joins, Types of joins, Joining More than two tables, Outer Joins, UNION Joins, SQL -92 Join Syntax.

**Subqueries:** What Is a subquery, Types of Subqueries, subqueries that return a list of values, subqueries that return a single value, writing complex queries, using subqueries in UPDATE and DELETE statement, using subqueries with INSERT

### UNIT III - DATABASE MANAGEMENT 9

**Using Views:** Creating Views, Advantages of Using Views, Creating Column Aliases, Single - Table Views, Views that Use Joins, Creating Views with Subqueries, Using Other Join Operations in views, Nesting Views, Updating Views, tasks you can accomplish with views.

**The SQL Security Model:** Overview of Database Security, Creating Database Users, database elements, Using GRANT and REVOKE, Security Roles, Views and Database Security.

**Real-World Issues Handling Specific Types of Data:** Numeric Data Types, String Data Types,

dealing with Dates, Converting Data Between Types.

**Database Performance and Integrity:** Improving Database Performance, Performance Measurement Tools, Indexes, The Query Optimizer, Data Integrity, Integrity Versus Performance. **Transactions and Cursors:** Transactions, Using Transactions in Oracle, Using Transactions in Transact -SQL, Database Locks, The Transaction Log, Cursors, Using Cursors in Transact -SQL, Using Cursors in Oracle PL/SQL

#### **UNIT IV - STORED PROCEDURES**

**9**

**Writing Stored Procedures:** Writing a Stored Procedure, working with Variables, Defining Blocks of Code, Conditional Statements Using IF, using Loops, Looping Over a Cursor, Triggers.

**More on Transact - SQL Stored Procedures:** General Transact - SQL Programming Information, Global Variables, Using RETURN to Leave Stored Procedures, Handling Errors, Using Temporary Objects, WAITFOR, Advanced Trigger -Writing Techniques.

**Writing Oracle PL/SQL stored Procedures:** The Declaration Section, The Executable Section, Exception Handling, Writing Stored Procedures, Creating and Using Custom Functions, Bundling Procedures and Functions in Packages, Debugging PL/SQL Queries, Triggers.

#### **UNIT V - SPECIFIC DATABASES**

**9**

**Oracle:** SQL\*PLUS, Creating Reports in SQL\*PLUS, Oracle System Views, Sequences, Synonyms, Oracle Data Types, Oracle Resources on the Web

**Microsoft Access:** Microsoft Database Files, ODBC, The Access Interface, Objects in Microsoft Access, Creating Tables, Data types, Creating and Running Queries, Creating an ODBC Datasource, Microsoft Access Resources

**MySQL:** Obtaining MySQL and MSQL, Contrasting MySQL and MSQL, Using MySQL, MySQL Features, MySQL Limitations, MySQL Data Types, MySQL Syntax, MSQL, String Comparisons in MSQL and MySQL.

**TOTAL = 45 Hours**

#### **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Illustrate database design and execute various DDL and DML queries.
- Retrieve data using subqueries and combine tables using Joins.
- Execute various advanced SQL queries related to Transaction Processing & Locking using concept of Concurrency control.
- Execute SQL queries related to data control language to enforce security in a multi user database environment.
- Create simple and advanced PL/SQL code blocks for stored procedures, cursors and triggers.

#### **REFERENCES**

1. **Special Edition Using SQL Paperback, Rafe Colburn, Paperback, 1<sup>st</sup> edition 1999. (Units-I-V)**
2. "Sams Teach Yourself SQL in 10 Minutes" By Ben Forta, sams, 2012
3. "Learning SQL" By Alan Beaulieu, O'Reilly Media, 2014
4. "SQL: The Ultimate Beginners Guide: Learn SQL Today" By Steve Tale, wizeduck.com, 2016.
5. "SQL: QuickStart Guide - The Simplified Beginner's Guide To SQL" By Clydebank Technology, EPUB, 2015.



## P18MCA304 - ADVANCED DATA STRUCTURES, ALGORITHMS, AND ANALYSIS

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES

This course will enable the student to:

- Acquire the knowledge of linear data structures and its applications.
- Learn to implement non-linear data structures are tree and graph.
- Use search and sorting techniques in various structures.
- Apply right algorithm designing techniques to solve real-time problems.
- Describe the advanced techniques to design and implement data structures.

### UNIT I - LINEAR DATA STRUCTURES 9

Lists, Stacks, and Queues: Abstract Data Types - The List ADT - Array Implementation of Lists - Linked Lists - Doubly Linked Lists - Circularly Linked Lists - Stack ADT - Queue ADT.

### UNIT II - NON-LINEAR DATA STRUCTURES 9

Trees: Binary Trees - Binary Search Trees - AVL Trees - B-Trees - Graph Algorithms: Topological Sort - Shortest Path Algorithms - Minimum Spanning Tree - Introduction to NP-Completeness.

### UNIT III - HASH, HEAP, SORTING TECHNIQUES 9

Hashing: Hash function - Open Addressing - Priority Queues: Binary heap - Binomial Queues - Sorting - Merge Sort - Quick Sort - Bucket Sort - External Sorting.

### UNIT IV - ALGORITHM DESIGNING TECHNIQUES 9

Algorithm Design Techniques: Greedy Algorithms - A Simple Scheduling Problem - Huffman Codes - Divide-and-conquer - Closest-Points Problem - The Selection Problem - Dynamic Programming - Optimal Binary Search Tree - All-Pairs Shortest Path - Randomized Algorithm - Random Number Generators - Backtracking Algorithms - Games.

### UNIT V - ADVANCED DATA STRUCTURES AND IMPLEMENTATIONS 9

Amortized Analysis -Fibonacci Heaps - Splay Trees - Top-down Splay Trees - Red-Black Trees - Deterministic Skip Lists - AA-Trees - Treaps - k-d trees - Pairing Heaps.

**TOTAL = 45 Hours**

### COURSE OUTCOMES:

At the end of the course the student should be able to:

- Design ADT in various applications to solve computing problems.
- Depict tree and graph structures in non-linear manner and organize the structures.
- Apply Hash, Heap and sorting techniques in data structures.
- Implement algorithm designing techniques to solve real-time problems.
- Design data structures with advancement techniques.

## REFERENCES

1. **Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Twenty Fifth Impression, Pearson,2002 (Unit I - V).**
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Clifford Stein,"Introduction to Algorithm", Second Edition, PHI.
3. NarasimhaKarumanchi, "Data Structures and Algorithms Made Easy", 5<sup>th</sup> Edition, CarrerMonk Publication, 2017.
4. Michael T.Goodrich, Roberto Tamassia, Michael H.Goldwasser, "Data Structures & Algorithms in Java", 6<sup>th</sup> edition, Wiley, 2014.
5. Anany Levitin, "Introduction to The Design and Analysis of Algorithms", 3<sup>rd</sup> Edition, 2012.
6. Thomas H.Cormen,"Algorithms Unlocked", MIT Press, 2013.
7. Peter Brass, "Advanced Data Structures", Cambridge University Press, 2008.

## P18MCA305 - DATA COMMUNICATION AND NETWORKING

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- To construct an understanding of the fundamental concepts of computer networking.
- To acquire the knowledge of layered approach that makes design, implementation and operation of extensive networks possible.
- To allow the student to gain expertise in WWW.
- Understand the services of TCP and UDP Protocols.
- To provide the Internet trend and applications.

### UNIT I - INTRODUCTION 9

Communication model - Data communications and networks - Topologies - Transmission Media - Protocol architecture: OSI - TCP/IP - Data encoding techniques - Modems.

### UNIT II - DATA LINK LAYER 9

**Data link control protocols:** flow control and error control - HDLC - Error detection and Error correction - **Wired LANs:** MAC- Ethernet-Token ring - **wireless LANs:** 802.11 - Wi-Fi - Bluetooth - WiMAX.

### UNIT III - NETWORK LAYER 9

**Switching concepts:** Circuit switching - Packet switching - **IP addresses:** IPV4 Addresses-IPV6 Addresses - ICMP - Routing Protocols: Distance vector - Link state - BGP.

### UNIT IV - TRANSPORT LAYER 9

Transport layer services - User Datagram Protocol (UDP) - Transmission Control Protocol (TCP) - Connection establishment and termination - Congestion control and avoidance - Queuing disciplines.

### UNIT V - APPLICATION LAYER 9

Domain Name Space (DNS) - rlogin - Telnet-Electronic Mail: SMTP, MIME, And IMAP - FTP - WWW-HTTP-SNMP

**TOTAL = 45 Hours**

## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Understand the fundamental concepts of data communications and networking
- Identify the different components and their respective roles in a computer communication system.
- Apply the knowledge, concepts and terms related to data communication and networking.
- Identify the different types of network topologies and protocols.
- Familiar with http protocol and World Wide Web.

## **REFERENCES**

1. Behrouz A. Forouzan, "Data communication and Networking", 5<sup>th</sup> Edition, Tata McGraw-Hill, 2012.
2. William Stallings, "Data and Computer Communication", 9<sup>th</sup> Edition, Pearson Education, 2011.
3. Larry L.Peterson& Bruce S.Davie, "Computer Networks - A systems approach", 5<sup>th</sup>Edition, Morgan Kaufmann Publishers, 2012.
4. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 2003.
5. Andrew S. Tanenbaum, "Computer Networks", PHI, 4<sup>th</sup> Edition, 2003.



## P18MCA306 -JAVA PROGRAMMING LABORATORY

L	T	P	C	M
0	0	4	2	100

### COURSE OBJECTIVES:

**This course will enable the student to:**

- Gain knowledge on the basic programming skills in Java
- Understand inheritance, packages and interfaces in Java
- Interpret the need of OOP in Java
- Perceive the significance of programming techniques of Java
- Acknowledge the significance of Database connectivity in Java

### LIST OF EXPERIMENTS

1. Create an application that demonstrates Class, Methods and Objects in Java.
2. Create an application that demonstrates Inheritance and Interfaces.
3. Create an application that demonstrates Packages.
4. Implement an application that illustrates the methods of the STRING class.
5. Implement an application in OOP that illustrates the File handling.
6. Implement Multi-threading concepts in Java.
7. Implement the scenarios to handle exceptions in Java.
8. Implement the scenarios to play around with Arrays in Java.
9. Develop an application that uses AWT controls.
10. Develop an application using Applet and MySQL to demonstrate DB connectivity in Java.

**Total - 45 Hours**

### COURSE OUTCOMES:

**At the end of the course the student should be able to:**

- Demonstrate applications that implements various programming techniques and multi-threading.
- Design an application in Java based on the requirements for file handling and AWT controls.
- Create an application in Java that demonstrate Database connectivity

## P18MCA307 - DATA BASE DESIGN AND PROGRAMMING WITH SQL LABORATORY

L	T	P	C	M
0	0	4	2	100

### COURSE OBJECTIVES:

**This course will enable the student to:**

- Describe, define and apply the major components of the relational database model to database design
- Learn and apply the Structured Query Language (SQL) for database definition and manipulation
- Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
- design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

### LIST OF EXPERIMENTS

1) Consider the following schema for a Library Database:

BOOK (Book\_id, Title, Publisher\_Name, Pub\_Year)

BOOK\_AUTHORS (Book\_id, Author\_Name)

PUBLISHER (Name, Address, Phone)

BOOK\_COPIES (Book\_id, Branch\_id, No-of\_Copies)

BOOK\_LENDING (Book\_id, Branch\_id, Card\_No, Date\_Out, Due\_Date)

LIBRARY\_BRANCH (Branch\_id, Branch\_Name, Address)

Write SQL queries to

1. Retrieve details of all books in the library - id, title, name of publisher, authors, number of copies in each branch, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017
3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
5. Create a view of all books and its number of copies that are currently available in the Library.

2) Consider the following schema for Order Database:

SALESMAN (Salesman\_id, Name, City, Commission)

CUSTOMER (Customer\_id, Cust\_Name, City, Grade, Salesman\_id)

ORDERS (Ord\_No, Purchase\_Amt, Ord\_Date, Customer\_id, Salesman\_id)

Write SQL queries to

1. Count the customers with grades above Bangalore's average.
2. Find the name and numbers of all salesmen who had more than one customer.
3. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.)
4. Create a view that finds the salesman who has the customer with the highest order of a day.

5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

3) Consider the schema for Movie Database:

ACTOR (Act\_id, Act\_Name, Act\_Gender)

DIRECTOR (Dir\_id, Dir\_Name, Dir\_Phone)

MOVIES (Mov\_id, Mov\_Title, Mov\_Year, Mov\_Lang, Dir\_id)

MOVIE\_CAST (Act\_id, Mov\_id, Role)

RATING (Mov\_id, Rev\_Stars)

Write SQL queries to

1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
5. Update rating of all movies directed by 'Steven Spielberg' to 5.

4) Consider the schema for College Database:

STUDENT (USN, SName, Address, Phone, Gender)

SEMSEC (SSID, Sem, Sec)

CLASS (USN, SSID)

SUBJECT (Subcode, Title, Sem, Credits)

IAMARKS (USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)

Write SQL queries to

1. List all the student details studying in fourth semester 'C' section.
2. Compute the total number of male and female students in each semester and in each section.
3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
5. Categorize students based on the following criterion: If FinalIA = 17 to 20 then CAT = 'Outstanding' If FinalIA = 12 to 16 then CAT = 'Average' If FinalIA < 12 then CAT = 'Weak' Give these details only for 8th semester A, B, and C section students.

5) Consider the schema for Company Database:

EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo)

DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate)

DLOCATION (DNo, DLoc)

PROJECT (PNo, PName, PLocation, DNo)

WORKS\_ON (SSN, PNo, Hours)

Write SQL queries to

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10

percent raise. 3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department

4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator). For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.

6) Consider the database for a college and design an ER diagram. Write the query for the following.

1. Create the tables:

- a. Student (sid, sname, sex, dob,dno)
- b. Department (dno, dname)
- c. Faculty (F\_id, fname, designation, salary,dno)
- d. Course (cid, cname, credits,dno)
- e. Register (sid,cid,sem )
- f. Teaching (f\_id,cid,sem)
- g. Hostel (hid,hname,seats,)

2. Include the necessary constraints NOT NULL, DEFAULT, CHECK, and PRIMARY KEY, UNIQUE.

3. Create a database college

4. Use college as the current database

5. Display all the tables in college database

6. Describe the structure of all tables

7. Modify the student table to add a new field 'grade'

8. Insert at least 5 tuples into each table.

9. List the details of students in the ascending order of date of birth

10. Display the details of students from computer department

11. List the faculties in the descending order of salary

12. Display the total number of students in each department

13. Display the total number of faculties in each department with salary greater than 25000

14. List out the ID, Name and Date of Birth of students registered for a specific course.

15. List out the ID, Name and Date of Birth of students registered for a specific course, staying in a specific Hostel.

16. List the names of faculties who teach for a specific course.

17. Display the student details by implementing left inner join

18. Display the student details by implementing a right outer join

19. Write a procedure which accepts the student number and displays the department in which he belongs to.

20. Create a cursor to modify the salary of 'Professors' belonging to all departments by 150%.

21. Consider the college database. Retrieve all students who have registered for a specific course and store their details into another table using cursors.

22. Write a before delete trigger on student table.

7) Consider the database for a banking enterprise. Write the queries for the below questions.

1. Create the following tables



Table	Attributes
customer	cid, cname, loc, sex, dob
Bank_brn	bcode, bloc, bsate
Deposit	Dacno, dtype, ddate, damt
Loan	Lacno, ltype, ldate, lamt
Accounts_in	Bcode, cid
depositor	cid, dacno
borrower	cid, lacno

2. Include necessary constraints such as NOT NULL, DEFAULT, CHECK, and PRIMARY KEY, UNIQUE.
3. Tables are created under the database 'bank'. Display all the tables in bank database. Describe the structure of all tables. Insert at least 5 tuples in each table
4. Display the branch details
5. List the customers of 'Mumbai' city
6. List the male customers of 'Kolkata' city
7. List the state having more than one branch.
8. List the deposit schemes provided by the bank to the customers
9. Delete the entire content of any table
10. List the deposit account number and amount in which the deposit scheme having maximum deposit is opened
11. List the account number and amount of that savings bank deposit scheme in which minimum amount is deposited.
12. List the customers having accounts in 'Chennai' branch
13. List the customers having more than one account
14. List the customers having same name but different account numbers.
15. List the customer name that is having maximum deposit account in bank
16. List the customer who has borrowed highest amount of home loan
17. Display the customer details by implementing left inner join
18. Display the customer details by implementing a right outer join
19. Write a procedure which accept the account number of a customer and retrieve the balance.
20. Consider the bank database. Retrieve all customers who have loan at a particular branch using cursor.
21. Write an update trigger on Account table. The system should keep track of the records that are being updated.

#### 8) Mini project

For any problem selected, write the ER Diagram, apply ER mapping rules, normalize the relations, and follow the application development process.

Make sure that the application should have five or more tables, at least one trigger and one stored procedure, using suitable frontend tool.

Indicative areas include; Health care, Agriculture, Industry, Transport, Supply chain, etc.

**Total - 45 Hours**

## **COURSE OUTCOMES:**

At the end of the course the student should be able to:

- Create database with different types of integrity constraints and use the SQL commands such as DDL, DML, DCL, and TCL to access data from database objects along with security.
- *identify* the basic concepts and various data model used in database design and ER modelling concepts and architecture use and *design* ER-models to represent simple database application scenarios.
- design, implement and demonstrate a database solution for real database applications.

## P18MCA308 - ADVANCED DATA STRUCTURES, ALGORITHMSLABORATORY

L	T	P	C	M
0	0	4	2	100

### COURSE OBJECTIVES:

**This course will enable the student to:**

- Write C program to design linear data structures and implement its operations.
- Write C program to design, arrange and apply searching techniques in non-linear data structures.
- Write C program to design algorithm techniques to solve real-time problems and implement data structures.

### LIST OF EXPERIMENTS

1. Stack and Queue implementation using array.
2. Singly linked list and its operations.
3. Implement stack and its application using linked list.
4. Implement queue using linked list.
5. Doubly linked list and its operations.
6. Circular linked list and its operations.
7. Apply tree traversals to visit n nodes in a tree.
8. Sort n numbers using Merge and Quick sort techniques.
9. Find the shortest path in a graph using Dijkstra algorithm.
10. Generate random numbers.

**Total - 45 Hours**

### COURSE OUTCOMES:

**At the end of the course the student should be able to:**

- Design List ADTs.
- Implement searching, sorting techniques in trees and graphs.
- Apply suitable designing algorithm in data structures that solve real-time problems.

## P18MCA309 - SOFT SKILL DEVELOPMENT LABORATORY-III

L	T	P	C	M
0	0	2	1	100

- **Focus on Language-** suffix, prefix, error detection, compound noun, countable / uncountable nouns, collocations, phrasal verbs, idioms and phrases, link expressions, question tags
- **Reading** - Reading comprehension, understanding notices, messages, timetables, advertisements, graphs, etc. reading passages for specific information transfer
- **Writing** - Report writing, proposal writing
- **Speaking** - Self introduction, personal information, name, home background, study details, area of interest, hobbies, strengths and weaknesses, projects and paper presentations, likes and dislikes in food, travel, clothes, special features of home town, Introduction to articulation skills, mini presentation, situational role play

**Total - 30 Hours**

### **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Exhibit good understanding of the basic grammar of the language
- Prepare reports and proposals
- Introduce themselves in a formal situation
- Read and interpret timetables, graphs, etc.

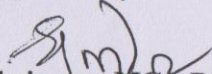
### **References**

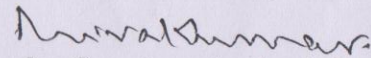
- English and Soft Skills, Dhanavel, S.P. Hyderabad: Orient Black Swan Ltd. 2010.
- Fundamentals of Business English- Infosys Campus Connect
- Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Norman Whitby Cambridge University Press, 2006.
- Common Mistakes at Intermediate- Liz Driscoll

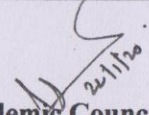
Sona College of Technology, Salem  
(An Autonomous Institution)  
Courses of Study for MCA IV Semester under Regulations 2018  
Branch: Master of Computer Applications

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>Theory</b>						
1	P18MCA401	Web Technology	3	0	0	3
2	P18MCA402	Mobile Application Development	3	0	0	3
3	P18MCA403	Python Programming	3	0	0	3
4	P18MCA723	Elective - Internet of Things	3	0	0	3
5	P18MCA711	Elective - User Interface Design	3	0	0	3
	P18MCA713	Elective - Business Intelligence				
6	P18MCA705	Elective - Artificial Intelligence	3	0	0	3
	P18MCA722	Elective - Green Computing				
<b>Practical</b>						
7	P18MCA404	Web Technology Laboratory	0	0	4	2
8	P18MCA405	Mobile Application Development Laboratory	0	0	4	2
9	P18MCA406	Python Programming Laboratory	0	0	4	2
10	P18MCA407	Soft Skill and Aptitude Career Enhancement Laboratory - IV	0	0	2	1
<b>Total Credits</b>						<b>25</b>

Approved by

  
Chairman, MCA BOS  
Dr. T. Padma

  
Member Secretary, Academic Council  
Dr. R. Shivakumar

  
Chairperson, Academic Council & Principal  
Dr. S.R.R. Senthil Kumar

Copy to:-

Director, Fourth Semester MCA Students and Staff, COE

11.12.2019

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P18MCA401 - WEB TECHNOLOGY					
	L	T	P	C	M
	3	0	0	3	100
<b>COURSE OBJECTIVES:</b>					
<p><b>This course will enable the student to:</b></p> <ul style="list-style-type: none"> <li>• Overview the concepts and features of HTML5.</li> <li>• Apply Cascading stylesheets properties for formatting the web page.</li> <li>• Develop embedded dynamic scripting on client side Internet Programming</li> <li>• Explore web development techniques on AJAX</li> <li>• Create simple AngularJs Applications</li> </ul>					
<b>UNIT I - HTML</b>					<b>9</b>
Introduction to Web Technology - Server side and Client side programming - Fundamentals of HTML - HTML5 Features - Working with Text - Organizing Text in HTML - Working with Links and URLs, Lists, Creating Tables, Working with Images, Colors, and Canvas - Working with Forms - Interactive Elements - Table Layouts - Iframes.					
<b>UNIT II - CSS</b>					<b>9</b>
Overview of CSS, Basic syntax and structure - Inline Styles - Embedding Style Sheets - Linking External Style Sheets, Backgrounds and Color Gradients in CSS - Fonts and Text Styles - Creating Boxes and Columns Using CSS - Displaying, Positioning, and Floating an Element - List Styles.					
<b>UNIT III - JAVASCRIPT(Dynamic HTML)</b>					<b>9</b>
Overview of JavaScript, Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array - Regular Expressions - JavaScript Functions, Events- Document Object Model-Validation.					
<b>UNIT IV - AJAX and jQuery</b>					<b>9</b>
Overview of AJAX - Create a simple AJAX application - Asynchronous data transfer with XMLHttpRequest - jQuery Introduction-Loading and using jQuery - jQuery selectors.					
<b>UNIT V - ADVANCED WEB TECHNOLOGIES</b>					<b>9</b>
AngularJS: Fundamentals - Angular JS Expressions- Components-Ng Modules - Forms - HTTP Client - AngularJS Validation.					
					<b>TOTAL = 45 Hours</b>



## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Create a simple web page using HTML5 and design a web page using CSS.
- Design front end web page using various web technologies
- Design Client side validation using scripting languages.
- Create a simple web application using AJAX
- Implement the functionalities of World Wide Web using Advanced web Technologies.

## **REFERENCES**

1. Kogent Learning Solutions Inc., "HTML5 Black Book: Covers CSS3, Javascript, XML, XHTML, Ajax, PHP and JQuery", First Edition, Dream Tech Press, 2011.(UNIT I,II,III,IV)
2. Chris Bates, "Web Programming building internet applications", 3<sup>rd</sup> Edition, wiley,2014
3. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How to Program", 5<sup>th</sup> Edition, Pearson Education, 2011.
4. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", 3<sup>rd</sup> Edition, Tata McGraw Hill, 2013.
5. David Flanagan, "JavaScript: The Definitive Guide, 6<sup>th</sup> Edition", O'Reilly Media, 2011.
6. Steven Holzner, "The Complete Reference - PHP", Tata McGraw Hill, 2008.
7. Achyut S Godbole and AtulKahate, "Web Technologies", 2<sup>nd</sup> Edition, Tata McGraw Hill, 2012.



P18MCA402 - MOBILE APPLICATION DEVELOPMENT					
	L	T	P	C	M
	3	0	0	3	100
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Relate the need of mobile applications and point out the importance of it.</li> <li>• Discuss on the basic concepts of android.</li> <li>• Identify the components beyond user interface and use them in an application.</li> <li>• Describe the advanced application development in android.</li> <li>• Discuss the basic concepts of iOS application development.</li> </ul>					
<b>UNIT I - INTRODUCTION TO MOBILE APPLICATIONS</b>					<b>7</b>
Introduction to mobile applications - Mobility landscape - Mobile platforms - Mobile apps development - Publishing and delivery of mobile applications - Requirements gathering and validation for mobile applications - Market and business drivers for mobile application.					
<b>UNIT II - MOBILE TECHNOLOGY I - ANDROID INTRODUCTION</b>					<b>9</b>
Android Introduction - Android features - Android Architecture - Mobile UI resources (Layout, Fragment, UI elements, Drawable, Menu) - Activity - states and life cycle - Interaction amongst activities - Notifications.					
<b>UNIT III - MOBILE TECHNOLOGY I - ANDROID APP DEVELOPMENT</b>					<b>10</b>
Threads - Async tasks - Services - states and life cycle - Shared preferences - Broadcast receivers - Telephony and SMS APIs - Animation.					
<b>UNIT IV - MOBILE TECHNOLOGY I - ANDROID ADVANCED CONCEPTS</b>					<b>10</b>
Multimedia-Audio/Video Playback and Record - Location Awareness - Native Hardware access using Accelerometer and Gyroscope- Mobile Databases using SQLite - Content Providers - Introduction to material designing.					
<b>UNIT V - MOBILE TECHNOLOGY II - iOS INTRODUCTION AND APP DEVELOPMENT</b>					<b>9</b>
Basics of Swift for iOS App development - iOS Introduction - features -Architecture - iOS Actions and Outlets - Story Board - Views - Simple iOS Application - iCloud introduction - iPhone market place - Distribution of iOS - Registering and creating AppID -Create and install distribution certificate - distribution provisioning profile - Build your app and embed the profile within app's bundle- Creating AppID on iTunes connect.					
					<b>TOTAL = 45 Hours</b>



## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Analyze the significance of mobile application development and its market value.
- Develop real time mobile applications and discuss the architecture, platform and tools required for mobile application.
- Design and develop an application with the given component.
- Develop an application beyond user interface with intricate tools like mobile databases, sensors, animation, multimedia etc.
- Analyze the Architecture, iCloud and the concepts of iOS.

## **REFERENCES**

1. Anubhav Pradhan, Anil V. Deshpande, "Composing Mobile Apps: Learn, Explore, Apply using Android ",Wiley Publications, 2014. (Unit I,II III& IV)
2. Craig Clayton , "IOS 12 Programming for Beginners", Packt publishing 3rd Edition(Unit V)
3. Barry Burd, "Android Application Development All in one for Dummies", Wiley Publications (Edition 1)
4. Lauren Darcey& Shane Conder, "Teach Yourself Android Application Development in 24 Hours", SAMS Publication, 2010.(Edition 1)
5. Andy Wigley, "Microsoft Mobile development Handbook", Microsoft Publications, 2001.
6. J.D.Gauchat, "iOS Apps for Masterminds ",Registration number 1126232, 4th edition, 2018.
7. Jonathon Manning ,Paris Buttfield-Addison ,Tim Nugent , "Learning Swift: Building Apps for macOS, iOS, and Beyond ",O'reilly , 3rd Edition.



P18MCA403 - PYTHON PROGRAMMING					
	L	T	P	C	M
	3	0	0	3	100
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Explain the basic concepts of Python programming.</li> <li>• Describe the logics of control flow statements.</li> <li>• Discuss the data structure concepts with the help of sequence.</li> <li>• Illustrate file handling functions.</li> <li>• Write python applications using MySQL.</li> </ul>					
<b>UNIT I - INTRODUCTION</b>					<b>9</b>
Features of Python- History of Python - The Future of Python - Python Interpreter and Interactive Mode - Writing and Executing First Python Program - Value and Types - Numbers - Boolean - Lists - Strings - Variables and Identifiers - Data Types -Statements - Reserved Words- Tuple Statement - Dictionary - Operators and Expressions - Expression in Python - Operations on Strings - Type Conversion - Comments - Function and Modules.					
<b>UNIT II - CONTROL FLOW AND FUNCTIONS</b>					<b>9</b>
Introduction to Decision Control Statements - Selection/Conditional Branching Statements - Basic Loop Structures/Iterative Statements - Nested Loops - The break Statement - The continue Statement - The pass Statement - The else Statement Used with Loops- Functions: Defining a Function - Function Call - Variable Scope and Lifetime - Fruitful Functions - Lambda Functions or Anonymous Functions - Function Composition in Python - Documentation Strings - Good Programming Practices - Recursive Functions - Function Redefinition.					
<b>UNIT III - SEQUENCE</b>					<b>9</b>
String: Concatenating, Appending, and Multiplying Strings - Strings are Immutable - String Formatting Operator - Built-in-String Methods and Functions - Slice Operation - ord() and chr() Functions - in and not in Operators - Comparing Strings - Iterating String - The String Module - Metacharacters in Regular Expression - Sequence-Lists - Tuple - Dictionaries.					
<b>UNIT IV - FILE HANDLING</b>					<b>9</b>
Introduction - File Path - Types of Files - Opening and Closing Files - Reading and Writing Files- File Positions - % Sting Formatting Operator - Command Line Arguments - Renaming and Deleting Files -Directory Methods.					
<b>UNIT V - PYTHON MODULES AND PACKAGES</b>					<b>9</b>
Introduction to Errors and Exceptions - Handling Exceptions - Multiple Except Blocks - Multiple Exceptions in a Single Block - Except Block Without Exception - The else cause - Raising Exceptions - Handling Exceptions in Invoked Functions - Built-in and User Defined Exceptions - The try...finally Block - Pre-defined Clean-up Action - Modules - Packages in Python - Standard Library Modules - SQL Introduction - Simple Queries - Create - Insert - update - delete - MySQL Introduction - connecting python and MySQL database.					
					<b>TOTAL = 45 Hours</b>



## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Write simple applications.
- Develop programs using loops.
- Create applications using functions.
- Develop application using files.
- Create application using Python and MySQL.

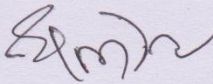
## **REFERENCES**

1. Reema Thareja, "Problem Solving and Programming with Python ", Second Edition, Oxford University Press 2019. (Unit I - V).
2. Swaroop C N, "A Byte of Python ", ebsshelf Inc., 1st Edition, 2013.
3. Wesley J. Chun, "Core Python Programming", Pearson, 2nd Edition, 2006.
4. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", O'Reilly Media, 2<sup>nd</sup> Edition, 2015.

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IV SEMESTER

  
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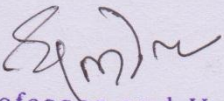


P18MCA723 - INTERNET OF THINGS					
	L	T	P	C	M
	3	0	0	3	100
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Understand the basics of IOT, design and communication models and then emerging technologies.</li> <li>• Exhibit Domain and system management for IoT applications.</li> <li>• Identify the protocols of IOT.</li> <li>• Understand the design and communications API for developing the IoT applications.</li> <li>• Use cloud services for IoT applications</li> </ul>					
<b>UNIT I - INTRODUCTION, DESIGN AND TECHNOLOGIES</b>					<b>9</b>
Introduction- Definition & Characteristics of IoT - Physical design of IoT - Things in IoT and IoT protocols - logical Design of IoT - IoT Functional Blocks - IoT Communication Model and IoT Communication APIs - IoT Enabling Technologies - Wireless Sensor Networks - Cloud Computing- Big Data Analytics - Communication Protocols - Embedded Systems - IoT Levels & Deployment Templates.					
<b>UNIT II - DOMAIN, M2M AND SYSTEM MANAGEMENT</b>					<b>9</b>
Introduction - Home Automation - Cities - Industry - Health & Lifestyle - M2M - SDN and NFV for IoT - Software Defined Networking - Network Function Virtualization - IoT System Management - Need for IoT Systems Management - Simple Network Management Protocol - Limitations of SNMP - Network Operator Requirements.					
<b>UNIT III - PROTOCOLS</b>					<b>9</b>
Protocols - IEEE 802.15.4 - The IEEE 802 Committee Family of Protocols - The Physical Layer - The Media Access Control Layer - Uses of 802.15 - BACNet Protocol - Modbus - KNX - Zigbee Architecture - Network layer - APS layer - Security.					
<b>UNIT IV - DEVELOPING INTERNET OF THINGS</b>					<b>9</b>
IoT Platforms Design Methodology - IoT System for Weather Monitoring - IoT System for Agriculture. Introduction to Cloud Storage Models & Communication APIs - WAMP - AutoBahn for IoT - Xively Cloud for IoT - Python Web Application Framework - Django Architecture -Starting Development with Django .Toolkit - arduino - raspberry pi.					
<b>UNIT V - CLOUD SERVICES FOR IOT</b>					<b>9</b>
Designing a RESTful Web API - Amazon Web Services for IoT - EC2 - Autoscaling - S3 - RDS - DynamoDB - Kinesis - SkyNet IoT Messaging Platform. Case studies - Environment - IoT systems for weather Reporting Bot - Air Pollution Monitoring System - Forest Fire Detection - IoT system for Energy - Smart grid - Renewable Energy Systems.					
					<b>TOTAL = 45 Hours</b>

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IV SEMESTER

  
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## COURSE OUTCOMES:

At the end of the course the student should be able to:

- Illustrate the design, communication model and enabling technologies for IoT.
- Analyze the system management and domain for various applications of IoT.
- Classify the various protocols that are used for developing IoT applications.
- Analyze the design methodology and cloud storage model for IoT applications.
- Identify the cloud services for various applications of IoT.

## REFERENCES

1. Arshdeep Bahga and Vijay Madisetti, "Internet of Things - A Hands-on Approach", Universities Press, 2015(Unit-I,II,IV,V).
2. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things - Key applications and Protocols", Wiley, 2012. (Unit III).
3. Dieter Uckelmann et.al, "Architecting the Internet of Things", Springer, 2011.
4. Cuno Pfister, "Getting Started with the Internet of Things", O'Reilly, 2011.
5. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley, 2014.
6. Honbo Zhou , "The Internet of Things in the Cloud: A Middleware Perspective ", CRC Press , 2012.

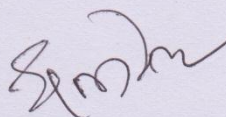


P18MCA711 - USER INTERFACE DESIGN					
	L	T	P	C	M
	3	0	0	3	100
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Learn the fundamental concepts, terms and technologies used in User interface design</li> <li>• Introduce the Interface design methodologies and evaluation process.</li> <li>• Construct the 3D Virtual environment.</li> <li>• Understand the Natural languages in computing and usability of interaction devices.</li> <li>• Know the importance of quality of services and to know the preparation of the user manuals.</li> </ul>					
<b>UNIT I - USABILITY OF INTERACTIVE SYSTEMS</b>					<b>9</b>
Introduction - Usability Goals and Measures- Usability Motivations - Universal Usability - Guidelines -Principles - Theories.					
<b>UNIT II - DEVELOPMENT PROCESSES</b>					<b>9</b>
Managing Design Processes: Introduction - Organizational Design to Support Usability - The Four Pillars of Design - Development Methodologies - Ethnographic Observation - Participatory Design - Evaluating Interface Designs: Expert Reviews - Usability Testing and Laboratories - Survey Instruments - Acceptance Tests - Evaluation During Active Use.					
<b>UNIT III - INTERACTION STYLES</b>					<b>9</b>
Direct Manipulation and Virtual Environments: Introduction - Examples of Direct Manipulation - Discussion of Direct Manipulation - 3D Interfaces - Tele operation - Virtual and Augmented Reality - Menu Selection, Form Filling, and Dialog Boxes: Introduction - Task-Related Menu Organization - Single Menus - Combinations of Multiple Menus - Content Organization - Fast Movement Through Menus - Data Entry with Menus: Form Filling, Dialog Boxes, and Alternatives - Audio Menus and Menus for Small Displays.					
<b>UNIT IV - COMMAND AND NATURAL LANGUAGES</b>					<b>9</b>
Introduction - Functionality to Support Users' Tasks - Command-Organization Strategies - The Benefits of Structure Naming and Abbreviations - Natural Language in Computing - Interaction Devices : Introduction - Keyboards and Keypads - Pointing Devices - Speech and Auditory Interfaces - Displays- Small and Large - Collaboration : Introduction - Goals of Collaboration - Asynchronous Distributed Interfaces: Different Time, Different Place - Synchronous Distributed Interfaces: Different Place, Same Time - Face-to-Face Interfaces: Same Place, Same Time.					
<b>UNIT V - DESIGN ISSUES</b>					<b>9</b>
Quality of Service : Introduction - Models of Response-Time Impacts - Expectations and Attitudes - User Productivity - Variability in Response Time - Frustrating Experiences - Balancing Function and Fashion : Introduction - Error Messages - Non anthropomorphic Design - Display Design -web page design - Window Design - Color. User Documentation and Online Help: Introduction - Online Versus Paper Documentation - Reading from Paper Versus from Displays - Shaping the Content of the Documentation - Accessing the Documentation - Online Tutorials and animated Demonstrations - Online Communities for User Assistance. Case Study: Email Automation, PDF data extraction & automation using UiPath.					
					<b>TOTAL = 45 Hours</b>

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## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Design a usable and compelling user-interface given a set of requirements and available technologies.
- Demonstrate the knowledge and ability to apply the design principles, techniques and technologies to the development of creative User Interface.
- Construct the 3D virtual environment with several menu organization components.
- Become familiar with the Natural language in computing.
- Develop expertise necessary for successful completing a quality project with manuals and help.

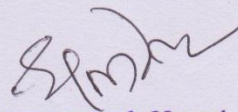
## **REFERENCES**

1. Ben Shneiderman, Catherine plaisant, "Designing the User Interface" Pearson AddisonWesely , Vth Edition, Fourth Impression,2017. (Unit :I,II,III,IV & V)
2. Wilbert O. Galitz ,The Essential Guide to User Interface Design : An Introduction to GUI Design Principles and Techniques 3rd Revised edition John Wiley and Sons Ltd, 17 Apr 2007.
3. Avram Joel Spolsky, "User Interface Design for Programmers", Apress; 1st ed. 2001. Corr. 2nd printing 2006 edition (25 January 2006).
4. Ian Clifton, Android User Interface Design: Implementing Material Design for Developers (Addison-Wesley Usability and Hci Series) Addison Wesley; 2 edition (19 November 2015).
5. Soren Lauesen, "User Interface Design: A Software Engineering Perspective, Addison Wesley (12 November 2004).

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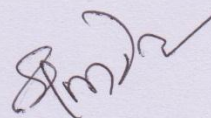


P18MCA713 - BUSINESS INTELLIGENCE					
	L	T	P	C	M
	3	0	0	3	100
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>Understand the fundamentals of BI from an enterprise context and Gain a basic knowledge of the significance digital data, types of digital data.</li> <li>Gather a deeper insight of OLAP, OLTP, BI- definition, need, history, Value chain.</li> <li>Identify the areas and problems that BI can solve and understand the need of Data Integration.</li> <li>Gain the knowledge of Data modeling techniques, types of Data model and the need of Measures &amp; metrics in Data science.</li> <li>Understand the need of Enterprise Reporting and identify the BI importance ahead.</li> </ul>					
<b>UNIT I - BUSINESS VIEW OF IT APPLICATIONS &amp; INTRODUCTION TO DIGITAL DATA</b>					<b>9</b>
Business View of Information Technology Applications: Business Enterprise Organization, Functions and Core Business Processes - Key purpose of Using IT in Business - The Connected World : Characteristics of Internet-ready IT applications - Enterprise Applications - Information Users and their Requirements. Types of Digital data: Getting to Know Structured Data, Unstructured Data, Semi-Structured Data.					
<b>UNIT II - EVOLUTION OF BUSINESS INTELLIGENCE</b>					<b>9</b>
Introduction to OLTP (On-Line Transaction Processing) and OLAP (On-Line Analytical Processing) - Different OLAP Architecture - OLTP Vs OLAP-Data Model for OLTP and OLAP - Role of OLAP tools in the BI architecture -A peek into the OLAP operations in Multidimensional Data. Getting Started with Business Intelligence: Business Intelligence (BI) Defined - Evolution of BI - Need for BI - BI for Past, Present and Future - BI Value Chain.					
<b>UNIT III - BASICS OF BI &amp; DATA INTEGRATION</b>					<b>9</b>
BI Definitions and Concepts: BI Component Framework - Who is BI for - BI Users -BI roles and responsibilities - Best practices in BI - Complete BI Professional. Data Integration: Need for Data Warehouse - Definition of Data Warehouse, Data Mart, ODS -Ralph Kimball's Approach vs Immon's Approach - Goals of Data Warehouse - Extract, Transform, and Load - What is Data Integration - Data Integration Technologies - Data quality - Data Profiling. Case Study - Kettle Software Introduction to ETL using Pentaho data Integration.					
<b>UNIT IV - DATA MODELING &amp; MEASURES, METRICS AND PERFORMANCE MANAGEMENT</b>					<b>9</b>
Multidimensional data model: Introduction - Data Modeling Basics - Types of Data Model - Data Modeling Techniques - Fact and dimension tables- Typical Dimensional Models - Dimensional modeling Life Cycle. Measures, Metrics, KPI's and Performance Management: Understanding Measures and Performance - Measurement System Terminology - Navigating a Business Enterprise, Role of Metrics and Metrics Supply Chain - "Fact-based Decision Making" and KPI's - KPI usage in Companies -Connecting the Dots: Measures to Business Decisions and Beyond. Case Study: Creating cubes using Microsoft Excel.					
<b>UNIT V - BASICS OF ENTERPRISE REPORTING &amp; FUTURE OF BI</b>					<b>9</b>
Basics of Enterprise Reporting: Reporting Perspectives common to all levels of Enterprise - Report Standardization and Presentation Practices - Enterprise Reporting characteristics in OLAP world - Balanced Scorecard - Dashboards - Create Dashboard - Scorecards vs Dashboards - Reporting Analysis. Future of BI: Understanding BI and Mobility - BI and Cloud Computing - BI for ERP systems - Social CRM and BI. Case Study: Enterprise reporting using MS Access / MS Excel.					
					<b>TOTAL = 45 Hours</b>

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### **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

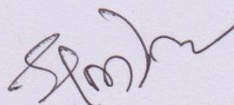
- Demonstrate the fundamentals of BI and categorize the data as of the requirement.
- Differentiate between OLTP & OLAP and identify the need of BI.
- Establish the basic skill of BI for any application data and integrate it for profiling.
- Exhibit data modeling technique for any application and integrate the Metrics, Measures and Performance.
- Design and implement the required reporting for any application.

### **REFERENCES**

- RN Prasad and Seema Acharya, "Fundamental of Business Analytics", Wiley India Pvt. Ltd, 2012. (Unit 1,2,3,4,5)
- John Boyer, Bill Frank, Brian Green, Tracy Harris, and Kay Van De Vanter "Business Intelligence Strategy: A Practical Guide for Achieving BI Excellence", IBM Corporation, 2010.
- Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
- Swain Scheps "Business Intelligence for Dummies", Wiley Publishing Inc, 2008.
- Cindi Howson "Successful Business Intelligence: Secrets to making BI a killer App", McGraw Hill, 2008.
- Elizabeth Vitt, Michael Luckevich, Stacia Misner "Business Intelligence: Making Better Decisions Faster", Microsoft Press, 2002.

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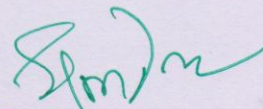


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P18MCA705 - ARTIFICIAL INTELLIGENCE					
	L	T	P	C	M
<b>COURSE OBJECTIVES:</b>	3	0	0	3	100
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Present an overview of artificial intelligence principles and approaches.</li> <li>• Demonstrate the building blocks of artificial intelligence in terms of Intelligent agents: Search, Knowledge representation, inference, logic and learning.</li> <li>• Know the characterization of reasoning and uncertainty principles.</li> <li>• Understand the principles of fuzzy logic systems and neural network theory.</li> <li>• Understand the concepts of genetic algorithms and artificial immune systems.</li> </ul>					
<b>UNIT I - OVERVIEW AND LOGIC</b>					9
<b>Overview of Artificial Intelligence:</b> Introduction - History of AI - Application of AI - Objectives of AI - Future of AI. <b>Symbolic Logic:</b> Logic - Propositions - Normal Forms in Propositional Logic - Logical Consequences - Resolution Principal - Predicate Calculus - Well Formed Formulas - Clausal Form - Rules of Inference - Unification - Resolution - Rule-Based Expert Systems.					
<b>UNIT II - KNOWLEDGE REPRESENTATION</b>					9
<b>Knowledge Acquisition and Representation:</b> Machine Intelligence - Knowledge Engineering - Procedure for Knowledge Acquisition - Knowledge Representation - Logical, procedural, network and structured representation schemes. <b>Reasoning and KRR Systems:</b> Reasoning - Knowledge Representation and Reasoning (KRR) System - Knowledge Representation Languages - Domain Modeling - Semantic Nets (Associative Networks) Reasoning Systems - Frame based systems - Hybrid representation systems.					
<b>UNIT III - UNCERTAINTY AND SEARCH</b>					9
<b>Uncertainty:</b> Introduction - Non-Monotonic and Monotonic Reasoning - Confidence Factor - Bayes Theorem - Dempster and Shafer's Theory of Evidence - Non classical Logics - Default logic - Bayesian networks. <b>Search Techniques:</b> Problem Representation - Representation schemes - Problem Solving in AI - Blind Search Techniques - Heuristic Search Techniques - Game Searches.					
<b>UNIT IV - ADVANCED TOPICS</b>					9
<b>Fuzzy Logic Systems:</b> Introduction - Crisp Sets - Fuzzy Sets - Fuzzy Terminology - Fuzzy Logic Control - Sugeno Style of Fuzzy Inference Processing - Fuzzy Hedges - $\alpha$ Cut Threshold - Neuro Fuzzy Systems. <b>Neural Networks:</b> Difference between human and machine intelligence, Features of biological neural networks, From human neurons to artificial neurons, Learning algorithms, Different network architectures and their applications, benefits and limitations of neural computing.					
<b>UNIT V - ADVANCED TOPICS</b>					9
<b>Genetic Algorithms: Copying Nature's Approaches:</b> A Peek into the Biological world - Genetic Algorithms (GAs) - Significance of the Genetic Operators - Termination Parameters - Niching and Speciation - Evolving Neural Networks - Theoretical Grounding - Ant Algorithms.					



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**Artificial Immune Systems:** Introduction - The Phenomenon of Immunity - Immunity and infection - The Innate Immune System - The First Line of Defense -The Adaptive Immune System - The second line of Defense - Recognition - Clonal Selection - Learning - Immune network Theory - Mapping Immune Systems to practical Applications - Other Applications.

**TOTAL = 45 Hours**

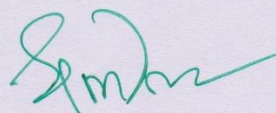
#### **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Illustrate the principles and approaches with real time problems.
- Learn various techniques of artificial intelligence building blocks and their applications
- Understand knowledge representation methodologies and principles of reasoning.
- Analyze fuzzy logic systems; various neural network architectures and their applications.
- Solve problems in various applications using genetic algorithms and artificial immune systems.

#### **REFERENCES**

1. Introduction to Artificial Intelligence, Rajendra Akerkar, PHI Learning, 2<sup>nd</sup> Edition, July 2014.
2. Artificial Intelligence, Kevin Knight, Elaine Rich, B. Nair, Paperback, Third Edition, Jul 2017.
3. Artificial Intelligence 3e: A Modern Approach Paperback, Russell, Pearson Education India, 3<sup>rd</sup> Edition, 2015.
4. Neural Networks, Fuzzy Systems and Evolutionary Algorithms: Synthesis and Applications, S. Rajasekaran, G. A. Vijayalakshmi Pai, PHI Learning, 2<sup>nd</sup> revised edition, June 2017.
5. Principles of Soft Computing, S. N. Sivanandam, S. N. Deepa, Wiley, Third edition, 2018.
6. Soft Computing techniques, N.P. Padhy, S.P. Simon, Oxford University Press; UK ed. Edition, Paperback, February 2015.



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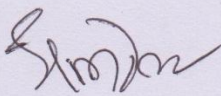


P18MCA722 - GREEN COMPUTING					
	L	T	P	C	M
	3	0	0	3	100
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Acquire basic concepts and knowledge for green computing practices.</li> <li>• Identify the required software in terms of energy saving practices and sustainability in green environment.</li> <li>• Gain a deeper knowledge of tools that will reduce paper waste and carbon footprint in data centers and storage mechanisms.</li> <li>• Familiarize with techniques related to Green computing in terms of Networks, Protocols, Sustainability etc.</li> <li>• Relate Cloud computing with Green computing and understand the basics behind it.</li> </ul>					
<b>UNIT I - INTRODUCTION</b>					<b>9</b>
Green IT: An Overview - Environmental Impacts of IT - Green IT - Holistic Approach to Greening IT - Greening IT - Green IT Standards - Green Devices and Hardware - Life Cycle of a Device or Hardware - Reuse, Recycle and Dispose.					
<b>UNIT II - GREEN SOFTWARE &amp; DEVELOPMENT</b>					<b>9</b>
Introduction - Energy-Saving Software Techniques - Evaluating and Measuring Software Impact to Platform Power - Software Tools - Introduction - Current Practices - Sustainable Software Development-Software Sustainability Attributes.					
<b>UNIT III - GREEN DATA CENTRES</b>					<b>9</b>
Data Centres and Associated Energy Challenges - Data Centre IT Infrastructure - Data Centre Facility Infrastructure - IT Infrastructure Management - Green Data Centre Metrics -Data Centre Management Strategies: A Case Study.					
<b>UNIT IV - GREEN NETWORKS, COMMUNICATIONS &amp; METRICS</b>					<b>9</b>
Introduction - Objectives of Green Network Protocols - Green Network Protocols and Standards - Sustainable Information Systems and Green Metrics: Introduction - Multilevel Sustainable Information-Sustainability Hierarchy Models.					
<b>UNIT V - GREEN CLOUD COMPUTING &amp; ENVIRONMENTAL SUSTAINABILITY</b>					<b>9</b>
Introduction - Cloud Computing Basics - Cloud Computing and Energy Usage Models - Features of Clouds Enabling Green Computing - Ewaste - Towards Energy Efficiency of Cloud Computing.					
					<b>TOTAL = 45 Hours</b>

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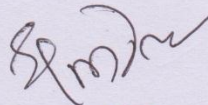
### **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Explain and relate the basics of Green Computing for any environment.
- Develop and design softwares that are eco-friendly and sustainable.
- Demonstrate applications that adhere to Green Data Centres metrics and storage.
- Identify and apply the Protocols, Networks and Sustainability strategies to mitigate energy consumption for any application.
- Illustrate and integrate application in a cloud-computing model and Green computing techniques.

### **REFERENCES**

1. San Murugesan, G.R.Ganagadharan, "Harnessing Green IT Principles and Practices", Wiley India Pvt, Feb 2013 Edition. (This is latest edition) (UNIT I,II,III,IV,V)
2. BhuvanUnhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, July 2011 Edition.
3. Wu Chun Feng (editor), "Green computing: Large Scale energy efficiency", CRC Press, June 2014 Edition.
4. Bud E. Smith, "Green Computing: Tools and Techniques for Saving Energy, Money, and Resources", Auerbach Publications, July 2013 Edition.
5. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shoff/IBM Redbook, March 2011 Edition.
6. Carl H Speshocky, "Empowering Green Initiatives with IT", John Wiley & Sons, Oct 2010 Edition





**P18MCA404 - WEB TECHNOLOGY LABORATORY**

L	T	P	C	M
0	0	4	2	100

**COURSE OBJECTIVES:**

**This course will enable the student to:**

- Learn the language of the web: HTML, CSS and Javascript.
- Create and develop a website using HTML, CSS and Javascript.
- Use CSS to design and layout the web pages.
- Use JavaScript to access and use web services for dynamic content.
- Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.

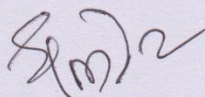
**LIST OF EXPERIMENTS**

1. Create a web page with the following using HTML
  - (i) To embed an image map in a web page
  - (ii) To fix the hot spots
  - (iii) Show all the related information when the hot spots are clicked.
2. Design an HTML5 interactive webpage using links, lists, forms, tables and style for any of the application.
3. Create a Web page Using CSS borders and Dropdown menus
4. Create a web page with all types of Cascading style sheets.
5. Develop a web page using different CSS selectors for adding menus.
6. Designing the application using JavaScript Functions.
7. Implement Client Side Scripts for Validating Web Form Controls using JavaScript.
8. Develop and demonstrate a HTML file that includes JavaScript that uses string methods for the following problems:
  - a) Parameter: A string  
Output: The position in the string of the left-most vowel
  - b) Parameter: A number  
Output: The number with its digits in the reverse order
9. Draw rectangle, circle, line and text with color gradients on a canvas using HTML and JavaScript.
10. Develop and implement a AJAX with PHP using XMLHttpRequest object.
11. Develop a web application for creating ng-app directive using HTML and AngularJS.

**COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Acquire knowledge about functionalities of World Wide Web
- Explore markup languages features and create interactive web pages using them.
- Design front end web page using AngularJS





**P18MCA405 - MOBILE APPLICATION DEVELOPMENT LABORATRY**

L	T	P	C	M
0	0	4	2	100

**Course Objectives:**

- Enhance programming skills as a mobile application developer.
- Understand the platform and tool available for developing mobile application
- Create applications that cater to users need.
- Implement the advanced concepts of mobile application development in real time scenarios.
- Access and work with database in mobile applications.

**List of Programs:**

Design and Develop mobile applications that illustrates the following:

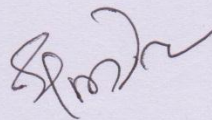
1. Interactive components in app's user interface
2. Menus to provide a familiar and consistent user experience
3. Transfers data between activities using Intents.
4. Implementation of Adapter View in the application
5. Notification that provide the user with reminders, communication from other people, or other timely information from your app.
6. Animation to change the object property and behavior at run time
7. Simple approach to image or video capture
8. Play and control the audio files in the application
9. Sensors to monitor the three-dimensional device movement.
10. Communication with a database to store the details in it.

**Course Outcomes:**

- Design and develop basic real time mobile applications that illustrates UI, intents and AdapterView.
- Implement Animation and Notifications in mobile applications
- Create a simple mobile application that illustrates Multimedia, Sensors and Communication with a Database.

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**P18MCA406 – PYTHON PROGRAMMING LABORATORY**

L	T	P	C	M
0	0	4	2	100

**COURSE OBJECTIVES:**

**This course will enable the student to:**

- Create python applications for real world problems.
- Apply data structure concepts in python.
- Acquire the knowledge of creating applications using python modules
- Write programs using file handling functions.
- Develop python applications with database using MySQL.

**LIST OF EXPERIMENTS**

1. Develop programs to learn operators using python.
2. Develop programs to learn string operations and string formatting in python.
3. Develop programs to understand the control structures of python.
4. Develop programs to learn concept of functions scoping and recursion.
5. Develop programs to learn different types of structures (list, dictionary, and tuples) in python.
6. Develop programs for data structure algorithms using python – searching and sorting.
7. Develop programs to implement built-in-string methods and functions.
8. Develop programs to read and write a text file.
9. Develop programs using Python Module.
10. Develop python application using MySQL Database.

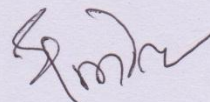
**COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Develop python applications for real world problems.
- Create applications using files
- Develop applications using MySQL

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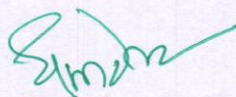
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P18MCA407-

Semester – IV	Soft Skill and Aptitude Career Enhancement Laboratory - IV	L	T	P	C	Marks
		0	0	2	1	100
<b>COURSE OUTCOMES:</b>						
<b>At the end of the course the student will be able to:</b>						
1. Demonstrate capabilities in supplementary areas of soft-skills and job-related selection processes using hands-on and/or case-study approaches						
2. Solve problems of advanced levels than those in specified areas of quantitative aptitude and logical reasoning and score 70-75% marks in company-specific internal tests						
3. Demonstrate greater than level of verbal aptitude skills in English with regard to given topics and score 70-75% marks in company-specific internal tests.						
4. Make effectively oral presentation and take part in group discussions and write formal letters, memos, paragraphs and notices						
<b>1. Soft Skills</b>	<b>Demonstrating soft-skill capabilities with reference to the following topics:</b> a) Presentation Skills b) Team work c) Leadership Skills d) Listening Skills e) Critical Thinking (Observation, Analysis, Interpretation, Reflection, Evaluation, Inference, Explanation, Problem Solving and Decision Making)					
<b>2. Quantitative Aptitude and Logical Reasoning</b>	<b>Solving problems with reference to the following topics:</b> a) Percentage b) Profit, loss & Discount c) Time & Work , Pipes & Cisterns d) Partnership e) Time Speed and Distance f) Logarithm g) Data Arrangement h) Data Sufficiency i) Ranking & Ordering j) Blood Relation k) Data Interpretation l) Company specific aptitude questions-1					
<b>3. Focus on language</b>	<b>Demonstrating verbal ability skills in English with reference to the following topics:</b> a) Subject verb agreement b) Modal verbs c) Reading comprehension d) Spotting errors e) Choosing the correct / incorrect sentences f) Describing the picture g) Critical Reasoning h) Theme Detection i) Cloze test					
<b>4. Speaking</b>	Mini presentation and group discussion					
<b>5. Writing</b>	Paragraph writing, e-mail, letter to editors and memos					
<b>6. Reading</b>	Reading advertisements and graphs, reading passages for specific information transfer					





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**Sona College of Technology, Salem**  
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**Courses of Study for MCA V Semester under Regulations 2018**  
**Branch: Master of Computer Application**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>THEORY</b>						
1	P18MCA501	Cloud Computing	3	0	0	3
2	P18MCA502	C# and .NET Programming	3	0	0	3
3	P18MCA503	Software Testing	3	0	0	3
4	P18MCA731	Elective - R Programming	3	0	0	3
5	P18MCA734	Elective - Object Oriented Analysis and Design	3	0	0	3
6	P18MCA724	Elective - Cyber Security	3	0	0	3
	P18MCA726	Elective - PHP Programming				
<b>PRACTICAL</b>						
7	P18MCA504	Cloud Computing Laboratory	0	0	4	2
8	P18MCA505	C# and .NET Programming Laboratory	0	0	4	2
9	P18MCA506	Mini Project Laboratory	0	0	4	2
10	P18MCA507	Soft Skills and Aptitude Career Enhancement Laboratory V	0	0	2	1
<b>Total Credits</b>						<b>25</b>

Approved by

  
**Chairman, MCA BOS**  
**Dr.T.Padma**

  
**Member Secretary, Academic Council**  
**Dr.R.Shivakumar**

  
**Chairperson, Academic Council & Principal**  
**Dr.S.R.R.Senthil Kumar**

Copy to:-  
 Director, Fifth Semester MCA Students and Staff, COE

28.05.2020

Regulations-2018

<b>P18MCA501 - CLOUD COMPUTING</b>					
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>M</b>
	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>100</b>
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Understand Cloud computing its services and virtualization techniques.</li> <li>• Explain the concept of cloud database and analyze the various security concerns of cloud.</li> <li>• Discuss on the storage and testing in cloud</li> <li>• Discuss on the different cloud implementation types</li> <li>• Describe the best practices of cloud.</li> </ul>					
<b>UNIT I - OVERVIEW OF CLOUD COMPUTING</b>					<b>9</b>
Introduction to Cloud Computing – Cloud service models – Cloud computing sub service models – Cloud deployment models – Alternative deployment models – Cloud architecture – Characteristics of cloud computing – Virtualization Techniques – Virtualization Technology – Overview of x86 virtualization - Types of Virtualization – Load balancing .					
<b>UNIT II - DATABASE AND SECURITY</b>					<b>9</b>
Cloud databases and File systems –Cloud database, Cloud File system, Cloud Programming model – Cloud Disaster Recovery - Cloud Middleware – Concept and Need of Cloud Middleware. Cloud optimized storage: scalability – Replications options – Data archiving methods – Physical storage facilities: Data center operations – Data monitoring strategies					
<b>UNIT III - CLOUD STORAGE AND CLOUD TESTING</b>					<b>9</b>
Security concerns of cloud computing – Cloud information security objectives - Cloud security and existing security solutions –Cloud Security Architecture, VM Security challenges , Vulnerability Assessment tools for cloud , Open source security solution products in cloud . - Cloud testing – Secure cloud software testing.					
<b>UNIT IV - REAL TIME APPLICATIONS OF CLOUD COMPUTING</b>					<b>9</b>
Amazon Cloud and its products – Google cloud and its product – Microsoft cloud and its product – Apple Cloud – Vmware cloud and its products - Cloud computing in business unit – Case studies – Working with google app engine and Hosting the application – Implementation of a cloud environment with Cloud Sim. Role of Cloud S- Big Data and IoT - Advanced cloud computing and supporting services.					
<b>UNIT V - BEST PRACTICES FOR CLOUD COMPUTING</b>					<b>9</b>
Fog Computing - Introduction – How Fog Computing works – Key differences between Fog and Cloud Computing - Consideration before adopting cloud – Development and environments for service development – Best practices- Economics of choosing a cloud platform for an organization.					
					<b>TOTAL = 45 Hours</b>



## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Apply the service models and deployment models of cloud computing in real time.
- Experiment with the databases of cloud, VM security challenge
- Appraise the storage and testing mechanisms of Cloud Computing.
- Analyze the integration of latest technologies with cloud computing.
- Illustrate all the strategies to follow best practices in Cloud Computing.

## **REFERENCES**

1. Rishabh Sharma , "Cloud Computing – Fundamentals , Industry approach and trends" ,Wiley Pub, 1st Edition 2015.(Unit 1,2,3,4,5).
2. Shailendra Singh,"Cloud Computing", Oxford university press, 2018(Unit 1,2,3)
3. Dr.S.AnandaMurugan,T.Priya,M.C.Arvind Babu,"Cloud Computing", University Science Press,2017.(Unit 4)
4. Barrie Sosinsky , " Cloud Computing Bible " , Wiley pub , 2011.
5. Buyya, Selvi ,Vecchiola" Mastering Cloud Computing – Foundations and application programming " ,TMH Pub, 1st Edition, 2013
6. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications, Cambridge University Press, 2010. [ISBN: 978-0521137355]
7. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, McGraw-Hill Education; 1 edition (1 November 2009) [ISBN: 0071626948]
8. Liz Kao, Jon Paz , "Salesforce.com for dummies " , Wiley , 6th Edition , 2016.
9. Dan Appleman,"Advanced Apex Programming",Desaware Publishing, 2nd Edition, 2013.



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**P18MCA502 - C# AND .NET PROGRAMMING**

L	T	P	C	M
3	0	0	3	100

**COURSE OBJECTIVES:****This course will enable the student to:**

- Explain how C# fits into the .NET platform and analyze the basic structure of a C# application.
- Discuss the object oriented aspects of C#.
- Develop applications using C# on .NET
- Design and develop Web based applications on .NET
- Understand the foundations of CLR execution.

**UNIT I - INTRODUCTION TO C#****9**

Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

**UNIT II – OBJECT ORIENTED ASPECTS OF C#****9**

Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception.

**UNIT III – APPLICATION DEVELOPMENT ON .NET****9**

Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box (Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET.

**UNIT IV – WEB BASED APPLICATION DEVELOPMENT ON .NET****9**

Programming web application with web forms, ASP.NET introduction, validating controls in ASP.NET, local and global deployment, techniques for deployment, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, MVC web application.

**UNIT V – CLR AND .NET FRAMEWORK****9**

Assemblies, Versioning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshaling, remoting, Introduction to LINQ.

**TOTAL = 45 Hours**

## COURSE OUTCOMES:

### At the end of the course the student should be able to:

- Gain a comprehensive understanding of the philosophy and architecture of C-Sharp programming
- Learn how to implement web applications using web forms, including programs that interact with databases.
- Attain a detailed knowledge of the building blocks of Web application, including CSharp, ASP.NET, Web Services
- Develop Rich Internet Web applications by using C#, ASP.NET, ADO.NET
- Deploy web application using ADO.NET

## REFERENCES

1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 3 edition, 2010
2. Jesse Liberty, "Programming C# 4.0", Sixth Edition, O'Reilly, 2010.
3. Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, 2012.
4. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.
5. Andrew Troelsen , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
6. Kogent Learning Solutions Inc ".NET 4.5 Programming 6-in-1" Black Book, Dreamtech Press, 2013.
7. Dr. Ashutosh Kumar Bhatt , Kamlesh Padaliya, "C # PROGRAMMING with .Net Framework", Bharti Publications; 1ST edition, 2016



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<b>P18MCA503 - SOFTWARE TESTING</b>					
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>M</b>
	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>100</b>
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Understand the concepts of test cases.</li> <li>• Learn the design of test cases.</li> <li>• Understand test management and test automation techniques.</li> <li>• Analyze and apply test metrics and measurements.</li> <li>• Understand the concepts and implement the testing automation tools.</li> </ul>					
<b>UNIT I INTRODUCTION</b>					<b>9</b>
Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Basic definitions – Software Testing Principles – The Tester’s Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design –Defect Examples- Developer/Tester Support of Developing a Defect Repository					
<b>UNIT II TEST CASE DESIGN STRATEGIES</b>					<b>9</b>
Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Random Testing – Requirements based testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – writing Test cases – format of test cases - evaluating test cases.					
<b>UNIT III LEVELS OF TESTING</b>					<b>9</b>
The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing –Compatibility testing – Testing the documentation – Website testing.					
<b>UNIT IV TEST MANAGEMENT</b>					<b>9</b>
People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group- The Structure of Testing Group- .The Technical Training Program					
<b>UNIT V TEST AUTOMATION</b>					<b>9</b>
Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics-Selenium terminology – Features and Limitations – Testing with Selenium.					
					<b>TOTAL = 45 Hours</b>

**COURSE OUTCOMES:**

**At the end of the course the students will be able to:**

- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plans and test cases designed.
- Develop and validate a test plan using automatic testing tools.

**TEXT BOOKS:**

1. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2006.
2. Anand Nayyar, Instant Approach to Software Testing: Principles, Applications, Techniques, and Practices, BPB Publications, First Edition, 2019.
3. Arnon Axelrod, Complete Guide to Test Automation: Techniques, Practices, and Patterns for Building and Maintaining Effective Software Projects, 1st ed. Edition, 2018.
4. Ron Patton, “Software Testing”, Second Edition, Sams Publishing, Pearson Education, 2007.
5. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2003.
6. Aditya P. Mathur, “Foundations of Software Testing - Fundamental Algorithms and Techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.



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## P18MCA504 - CLOUD COMPUTING LABORATORY

	L	T	P	C	M
Cloud Computing Laboratory	0	0	4	2	100

### Course Objectives:

- Relate the application of cloud computing with real time.
- Develop SaaS application in cloud CRM.
- Develop sample programs in any of the on demand cloud CRM in the market
- Create applications in cloud CRM in a very short time without any developmental cost.
- Develop custom applications in cloud CRM

### List of Programs:


Develop applications in cloud CRM that illustrates the following:

1. Formula and Validation – Basic and Advanced level.
2. Workflow Process – Creating records
3. Workflow process – Email Alert
4. Automation Process
5. Apex triggers
6. Data management
7. Visual Force pages
8. Simple SaaS Project in Cloud CRM.
9. Create a stunning dashboard with Einstein Analytics
10. SaaS Application – Suggestion Box

### Course Outcomes:

At the end of the course the student should be able to:

- Create real time applications that uses formulas, validation, and workflow and automation process in Cloud CRM.
- Create applications that describes Data Management tools in Cloud CRM.
- Illustrate the implementation of Apex Triggers in Cloud CRM.
- Illustrate the implementation of Visual Force pages in Cloud CRM.
- Create simple real time projects in CRM.

  
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**P18MCA505 - C# AND .NET PROGRAMMING  
LABORATORY**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>M</b>
<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>100</b>

**Course Objectives:**

- Learn to develop a Window based, Web based application and Console based application Gain a working knowledge of the C# programming language and learn how to build object-oriented applications using C#.
- Acquire a working knowledge of creating rich internet Web applications using the .NET Framework and Visual Studio.
- Configure and deploy a Microsoft ASP.NET Web application.
- Learn how to implement web applications using web forms, including programs that interact with databases.

**LIST OF PROGRAMS:**

1. Develop and generate a Window application for student Information System using Branching statements
2. Develop a console based application using Interface.
3. Design a Windows application to count the Number of Words, Number of Characters, Number of Numerals, and Number of Special Characters using Methods, Arrays and Strings.
4. Design and develop a window form application for Employee management system.
5. Create and Design a C# Window form application to find the area of Triangle, Circle and Rectangle using polymorphism.
6. Using Inheritance concepts, Develop a window based application to declare a base class Course and derived classes BA Course, B.Com Course and B.Sc Course. Print Hall ticket for the students in these courses.
7. Design and develop an online bookstore using window application.
8. Develop a window application and integrate Multimodule assembly to perform the arithmetic operations.
9. Design and implement a website for creating a Web registration form using ASP.NET.
10. Create a .NET web services application to implement an arithmetic Calculator.
11. Create a Campus registration form and perform data access tasks with ADO.NET.
12. Develop a MVC application that incorporates the following: Design a new Controller named "Cricket". Create a Model named "Player" with following properties: playerID, playerName, category, no\_of\_matches, no\_of\_fours, no\_of\_sixes, no\_of\_century, rank. Create an Index (List of Players) View and Methods in Cricket controller. Create insert/update/delete views in controller and perform all data CRUD (Create/Retrieve/Update/Delete) activities using ADO.Net.

**Course Outcomes:**

**At the end of the course the student should be able to:**

- Design, document, code and test small C# console and GUI applications.
- Design, document, code and unit test class libraries as part of a larger project.
- Create and develop a ADO.NET database application.
- Create simple web applications and window applications.
- choose an engineering approach to solving problems, starting from the acquired knowledge of programming



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## **P18MCA506 - MINI PROJECT**

L T P C M

0 0 4 2 100

Every student is required to carry out in-house Mini Project work under the supervision of a faculty member of the department. The students can do a project in a group of size between 3 and 4. The guide shall monitor progress of the student continuously. A candidate is required to present the progress of the Mini Project work once in a month during the semester at an appropriate time decided by the Department. There will a final presentation of the Mini Project work at the end of the semester. It is recommended that Mini Project is to be chosen which should have some direct relevance in day-to-day activities of the candidates in his/her institution.

The purpose of the project is to motivate them to work in emerging / latest technologies, help the student to develop ability to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories, this project will helps the student make ease and provides enough experience to carry out the larger project in the fifth and sixth semester.

### **COURSE OBJECTIVES**

- Application of knowledge and techniques learnt in theoretical classes for developing the software for
- real problems.
- Gives an insight into the working of the real organizations/companies.
- Gaining deeper understanding in specific functional areas.
- Helps in exploring career opportunities in their areas of interest.

Mini Project involves requirement analysis, feasibility analysis, Database design, coding, testing, implementation and maintenance.

### **MINI PROJECT PROPOSAL (SYNOPSIS) STRUCTURE**

Mini Project proposal should be prepared in consultation with the guide. It should clearly state the objectives and environment of the proposed Mini Project to be undertaken. Ensure to include the following items while submitting your Mini Project synopsis. Mini Project synopsis may contain 10-20 pages and sequence of contents strictly should be in the following order:

1. Cover and Title page
2. Synopsis Approval Performa duly filled and signed by the student
3. Index
4. Acknowledgement
5. Introduction and objective of the Mini Project
6. Analysis (Feasibility Study, DFD 0 Level, 1- Level and 2 Level/ER Diagram etc)
7. H/W and S/W Requirement
8. Table and Structure, Number of Modules, Detail of Modules, Data Structure
9. Types of Reports
10. Scope of future application

## COMMUNICATION OF SYNOPSIS APPROVAL

A list of approved synopsis will be put on the notice board of the Institute as per the dates mentioned in the activity schedule. In case of non approval, the suggestions for reformulating the Mini Project will be communicated to the student. Students can resubmit the modified synopsis to Project In-Charge of the Department of Master of Computer Applications as per the specified time given in activity schedule.

### MINI PROJECT REPORT STRUCTURE

The Mini Project should be prepared in consultation with the guide and may contain 100-150 pages (including coding). Mini Project Report should strictly follow the points given below:

#### Details

1. Cover and Title page
2. Synopsis Approval Certificate
3. Index
4. Acknowledgement
5. Certificate of Originality
6. Introduction/Aims and Objective
7. System Analysis
  - Identification of Need
  - Preliminary Investigation
8. Feasibility Study
  - 8.1. Technical Feasibility
  - 8.2. Economic Feasibility
  - 8.3. Operational Feasibility
9. Analysis (Feasibility Study, DFD 0 Level, 1- Level and 2 Level/ER Diagram, and Data structure, Table structure etc)
10. S/W Engineering Paradigm applied
11. S/W & H/W Requirement Specification
12. System Design
13. Screen Shots
14. Coding
15. Validation Checks
16. Implementation and Maintenance
17. Testing (Testing techniques and Testing strategies)
18. System Security measures
19. Various types of Reports/Modules
20. Pert Chart/Gantt Chart
21. Future scope of the Mini Project
22. Bibliography/References/Glossary
23. Original Copy of the Approved

#### Synopsis

### SUBMISSION OF A MINI PROJECT REPORT

Only one Copy of the Mini Project report in bound form is to be submitted to the Project In-Charge of the Department of Master of Computer Applications. Another copy of the Mini Project Report must be retained by the student which should be produced before the examiner at the time of the Viva-voice.

### MINI PROJECT EVALUATION

As per the norms Mini Project Report shall be evaluated by the examiner at the end of the semester. However there will be continuous monitoring of the Mini Project progress report during the semester and distribution of marks shall be as follows:

#### Sessional Semester End Exam

5 reviews – 30 (6 marks for each review)

Documentation – 20

Viva - 10

Viva - 10

Project Evaluation – 30

Total - 100

### LIST OF BROAD AREAS OF APPLICATION AND RELATED TOOLS

**TECHNOLOGY** Visual Studio 2008, .NET Framework 3.5

**FRONT END /GUI Tools** Visual Basic 6, Power Builder, X-Windows, VC++, Oracle Developer 2000

**RDBMS/BACK END** Sybase, SQL, SQL Server 2008, Oracle 10g

**LANGUAGES** C, C++, JAVA, VC++, C# 3.5

**INTERNET TECHNOLOGIES** HTML, DHTML, CSS, Java Script, DOM, JQuery, AJAX, ASP, ASP .NET, XML, Perl & CGI Script, SWING, JSP, Java Beans, Java Servlets, COBRA, UML, EDA, Broadvision, ATG, XSL, NET Dynamics, Silver Stream, Cold Fusion etc.

**WEB SERVER** IIS, APACHE, TOMCAT, J2EE etc.

**REPORTING** Crystal Report XI

**NETWORKING TECHNOLOGIES** ATM, Frame Relay, TCP/IP, SNMP, GSM, VOIP, PPP, IP-PSTN,

SONET/SDH

**WIRELESS TECHNOLOGIES** Blue Tooth, 2G, 3G, ISDN, EDGE, Wi-fi

**REALTIME OS/EMBEDED SKILLS** QNX, LINUX, OSEK, DSP, VRTX, RTXC, Nucleus

**OPERATING SYSTEMS** WINDOWS XP/VISTA/7, WINDOWS SERVER 2008, DOS, LINUX SUN, VRTX, SOLARIS, HP/UX, PSOS, IRIX


**PROJECT MANAGEMENT TOOLS:** JIRA

**APPLICATIONS** Financial / Manufacturing / Multimedia /Computer Graphics Instructional Design / Realtime application software / DBMS / Internet / Intranet / Computer Networking Communication Software / E-Commerce / ERP / MRP / TCP/IP Internals / Routing Protocols, Socket Programming Implementation of Switches and Routers.

### COURSE OUTCOMES:

At the end of the course the student should be able to:

- Develop software for real time problems.
- Analyse the functional areas of a given problem.
- Discover team-building skills required to support successful performance
- Synthesize a given real time problem
- Use the latest technologies in the project.

  
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**COURSE OUTCOMES:**

At the end of the course the student will be able to:

1. Demonstrate capabilities in supplementary areas of soft-skills and job-related selection processes using hands-on and/or case-study approaches
2. Solve problems of advanced levels than those in specified areas of quantitative aptitude and logical reasoning and score 70-75% marks in company-specific internal tests

**1. Soft Skills**

**Demonstrating soft-skill capabilities with reference to the following topics:**

- a. Career Planning
- b. Resume Writing
- c. Interview Skills
- d. Group Discussion Techniques
- e. Mock GD's
- f. Mock Interview.

**2. Quantitative Aptitude and Logical Reasoning Topics**

**Solving problems with reference to the following topics :**

- a. Permutation and Combination
- b. Probability
- c. Interest Calculation-Simple Interest and Compound Interest
- d. Crypto Arithmetic
- e. Functions & Polynomials
- f. Alligation or Mixture
- g. Clocks
- h. Geometry & Mensuration
- i. Syllogism
- j. Cubes & Dice
- k. Visual Reasoning
- l. Inequalities
- m. Analogies
- n. Number Series
- o. Company Specific Questions - 2

**3. Verbal Ability**

**Demonstrating English language skills with reference to the following topics:**

- a. Select the best alternative for the underlined part of the sentence
- b. Writing a quote for the given picture
- c. Writing story on a given picture
- d. Critical Reasoning
- e. Theme detection

**4. Speaking**

Interviews and presentation

**5. Writing**

Essay writing and story writing

**6. Reading**

Reading comprehension

  
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<b>P18MCA724- CYBER SECURITY</b>					
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>M</b>
	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>100</b>
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Understand the various types of cybercrimes.</li> <li>• Formulate the security problems in wireless devices and networks.</li> <li>• Identify the different types of cybercrimes and its associated cyber laws.</li> <li>• Gain knowledge about computer forensics and challenges in computer forensics.</li> <li>• Discuss the social impacts of cybercrime and privacy protection in an organization.</li> </ul>					
<b>UNIT I - INTRODUCTION TO CYBERCRIME</b>					<b>9</b>
Introduction: Cybercrime- Cybercrime and information security-Cyber criminals-Classification of cybercrimes-Cyber offenses: Attacks-Social engineering- Cyberstalking-Cyber cafe and cybercrimes-Botnets.					
<b>UNIT II - CYBERCRIME : MOBILE AND WIRELESS DEVICES</b>					<b>9</b>
Cybercrime : Mobile and Wireless Devices: Proliferation of mobile and wireless devices-Credit card frauds in mobile and wireless computing era -Security challenges posed by mobile devices -Registry settings for mobile devices -Authentication service security : Cryptographic security for mobile devices - LDAP security for hand- held mobile computing devices -Attacks on mobile phones - Tools and methods used in cybercrime: Proxy servers and anonymizers - Phishing - Password cracking - Key loggers and spywares - Buffer overflow -Attacks on wireless networks.					
<b>UNIT III - CYBER SECURITY : LEAGAL PERSPECTIVE</b>					<b>9</b>
Introduction - Cyber security evolution - Cyber Security objectives - Cyberlaws: The Indian context - Indian IT act - Digital Signature and the Indian IT act - Amendments to the Indian IT act - Cybercrime and the Punishment -Cyberlaw - Technology and students: Indian scenario.					
<b>UNIT IV - COMPUTER FORENSICS</b>					<b>9</b>
Introduction - Historical background of cyber forensics - Digital forensics science - Need for computer forensics -Cyber forensics and digital evidence - Forensics analysis of e-mail - Digital forensics life cycle -Chain of custody concept - Network forensics - Computer forensic investigation - Computer forensic and steganography -Challenges in computer forensics - Forensics auditing - Antiforensics.					
<b>UNIT V -SOCIAL IMPLICATIONS</b>					<b>9</b>
Introduction - Cost of cybercrime and IPR issues -Web threats for organizations - Security and privacy implications from cloud computing - Social media marketing -Social computing and associated challenges -Protecting people's privacy in the organization - Organizational guide lines for internet usage -Safe computing guidelines and computer usage policy - Incident handling -Forensics best practices for organizations - Media and asset protection -Importance of endpoint security in organizations.					
					<b>TOTAL = 45 Hours</b>

## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Acquire the knowledge about cybercrime and attacks in cybercrime.
- Explore the tools and methods used to protect wireless devices and networks from various attacks.
- Analyse various Indian acts imposed in cybercrime.
- Apply and know the importance of computer forensics in the digital world.
- Exhibit the media and asset protection of an organization.

## **REFERENCES**

1. Nina Godbole, Sunit Belapure, "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", 2019, Wiley Publications ( Unit I - V).
2. Jennifer L. Bayuk, Jason Healey, Paul Rohmeyer, Marcus H. Sachs, Jeffrey Schmidt, Joseph Weiss, "Cyber Security Policy Guidebook", 2017, Wiley Publications. (Unit -1)
3. Mayank Bhushan, Rajkumar Singh Rathore, Aatif Jamshed "Fundamental of Cyber Security Principles, Theory and Practices", BPB Publications.
4. Thomas J. Mowbray, "Cyber Security Managing Systems, Conducting Testing and Investigating Intrusions", 2019, Wiley Publications.
5. Khadsare S, " Cyber Security HandBook ", 2017, Mrs. Deepthy Chaudry publications.



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<b>P18MCA726 – PHP PROGRAMMING</b>					
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>M</b>
	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>100</b>
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Explain the basic concepts of PHP programming</li> <li>• Describe the logics of control flow statements</li> <li>• Discuss the concepts of object oriented programming using PHP</li> <li>• Write PHP web applications</li> <li>• Illustrate file handling functions in PHP</li> </ul>					
<b>UNIT I - INTRODUCTION</b>					<b>9</b>
Essential PHP – Getting PHP – Creating Development Environment – Creating and Running First PHP page – Mixing HTML and PHP – Printing Some Text – Printing some HTML – More Echo Power – Using PHP “Here” Documents – Command Line PHP – Adding Comments to PHP Code – Working with Variables – Storing Data in Variables – Interpolating Strings – Creating Variables – Creating Constants – Understanding PHP’s Internal Datatypes – Operators : PHP’s Math operators – Working with the assignment operators – Incrementing and Decrementing Values- The PHP String Operators – The Bitwise Operators – The Execution Operator – Operator Precedence – Comparison Operators – Logical Operators – Ternary operator.					
<b>UNIT II - FLOW CONTROL, STRINGS &amp; ARRAYS</b>					<b>9</b>
Using if Statement – else Statement – elseif Statement – The Switch Statement – Using for Loops – Using while Loops – Using do...while Loops – Using foreach Loop – Terminating Loops Early – Skipping Iterations – PHP Alternate Syntax –Strings and Arrays – The String Functions – Converting to and from Strings – Formatting Text Strings – Building Yourself Some Arrays – Modifying the Data in Arrays – Deleting Array Elements – Handling Arrays with Loops – The PHP Array Functions – Converting Between String and Arrays Using implode and explode – Extracting Data from Arrays – Sorting Arrays – Using PHP’s Array Operators – Comparing Arrays to Each Other – Handling Multidimensional Arrays – Using Multidimensional Arrays in Loops – Moving Through Arrays – Splitting and Merging Arrays – Other Array Functions.					
<b>UNIT III – FUNCTIONS &amp;OBJECT ORIENTED PROGRAMMING</b>					<b>9</b>
Creating Functions in PHP – Passing Functions Some Data – Passing Arrays to Functions – Passing by Reference – Using Default Arguments – Passing Variable Numbers of Arguments – Returning Data from Functions – Returning Arrays – Returning Lists –Returning References – Introducing Variable Scope in PHP – Accessing Global Data – Working with Static Variables – PHP Conditional Functions – PHP Variable Functions – Nesting Functions – Creating Include Files – Returning Errors from Functions – Object Oriented Programming : Creating Classes – Creating Objects – Setting Access to Properties and Methods – Using Constructors to Initialize Objects – Using Destructors to Clean Up after Objects – Basing one Class on Another with Inheritance – Overriding Methods –Overloading Methods – Autoloading Classes					
<b>UNIT IV – WEB CONCEPTS</b>					<b>9</b>
Reading Data in Web Pages: Setting Up Web Pages to Communicate with PHP – Handling Text Fields – Handling Text Areas – Handling Check Boxes – Handling Radio Buttons – Handling List Boxes – Handling Password Controls – Handling Hidden Controls – Handling Image Maps – Handling File Uploads – Handling Buttons – PHP Browser – Handling Power – Using PHP’s Server Variables – Using HTTP Headers –Getting the User’s Browser Type – Redirecting Browsers with HTTP Headers – Dumping a Form’s Data All at Once – Handling Form Data with Custom Arrays – Putting it All in One Page – Performing Data Validation – Checking if the User Entered Required Data – Requiring Numbers –Requiring Text – Persisting User Data – Client –Side Data Validation – Handling HTML Tags in User					

Input

#### UNIT V - FILE HANDLING

9

Opening Files Using fopen - Looping over a File's Contents with feof - Reading Text from a File Using fgets - Closing a File - Reading from a File Character by Character with fgetc - Reading a Whole File at Once with file\_get\_contents - Reading File into an Array with file - Checking if a File Exists with file\_exists - Getting File Size with filesize - Reading Binary Reads with fread - Parsing Files with fscanf - Parsing ini Files with parse\_ini\_file - Getting File Info with stat - Setting the File Pointer's Location with fseek - Copying Files with copy - Deleting Files with unlink - Writing to a file with fwrite - Reading and Writing Binary Files - Appending to Files with fwrite - Writing a File All at Once with file\_put\_contents - Locking Files

**TOTAL = 45 Hours**

#### COURSE OUTCOMES:

At the end of the course the student should be able to:

- Write simple PHP programs
- Develop programs using flow control statements in PHP
- Create applications using object oriented programming concepts
- Create web applications using PHP
- Develop application using files

#### REFERENCES

1. Steven Holzner, "The Complete Reference", Mc Graw Hill, 2008 (Unit I to V).
2. Vikram Vaswani, "PHP A Beginner's Guide", Mc Graw Hill, 2009.
3. Alan Forbes, "The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL", Createspace Independent Publishing Platform, 2017.
4. Robin Nixon, "Learning PHP, MySQL & JavaScript with jQuery, CSS & HTML5", O'Reilly, 2015.
5. Lynn Beighley, Michael Morrison, "Head First PHP & MySQL: A Brain-Friendly Guide", O'Reilly, 2011.
1. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 2007.
2. ROSS TIMOTHY J, "Fuzzy Logic with Engineering Applications", Wiley India Pvt Ltd, New Delhi, 2010.

  
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<b>P18MCA731-R PROGRAMMING</b>					
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>M</b>
	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>100</b>
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Discuss on the basic concepts of R and perform simple manipulations in R.</li> <li>• Describe the implantation of arrays and matrices using R language.</li> <li>• Relate the uses of lists and probability in R</li> <li>• Describe the functions and statistical models in R.</li> <li>• Discuss the graphics , packages and OS facilities in R.</li> </ul>					
<b>UNIT I - INTRODUCTION &amp;SIMPLE MANIPULATIONS</b>					<b>9</b>
Introduction and preliminaries -The R environment- Related software and documentation - R and statistics- R and the window system- Using R interactively- An introductory session - Getting help with functions and features - R commands, case sensitivity, etc. - Recall and correction of previous commands -Executing commands from or diverting output to a file- Data permanency and removing objects - Simple manipulations; numbers and vectors - Vectors and assignment - Vector arithmetic -Generating regular sequences-Logical vectors - Missing values- Character vectors -Index vectors; selecting and modifying subsets of a data set - Other types of objects					
<b>UNIT II - ARRAYS AND MATRICES</b>					<b>9</b>
Objects, their modes and attributes - Intrinsic attributes: mode and length - Changing the length of an object-Getting and setting attributes- The class of an object - Ordered and unordered factors -A specific example- The function tapply() and ragged arrays - Ordered factors - Arrays and matrices - Arrays -Array indexing. Subsections of an array- Index matrices - The array() function- Mixed vector and array arithmetic- The recycling rule -The outer product of two arrays - Generalized transpose of an array - Matrix facilities -Matrix multiplication - Linear equations and inversion - Eigenvalues and eigenvectors - Singular value decomposition and determinants - Least squares fitting and the QR decomposition - Forming partitioned matrices, cbind() and rbind()- The concatenation function, c(), with arrays- Frequency tables from factors					
<b>UNIT III - LISTS AND PROBABILITY</b>					<b>9</b>
Lists and data frames- Lists- Constructing and modifying lists --Concatenating lists - Data frames - Making data frames - attach() and detach() - Working with data frames- Attaching arbitrary lists - Managing the search path- Reading data from files- The read.table() function --The scan() function - Accessing builtin datasets - Loading data from other R packages- Editing data - Probability distributions - R as a set of statistical tables- Examining the distribution of a set of data - One- and two-sample tests-					
<b>UNIT IV - EXECUTION , FUNCTIONS AND STATISTICAL MODELS</b>					<b>9</b>
					<b>TOTAL = 45 Hours</b>



Grouping, loops and conditional execution - Grouped expressions - Control statements- Conditional execution: if statements- Repetitive execution: for loops, repeat and while - Writing your own functions -Simple examples - Defining new binary operators - Named arguments and defaults - The '...' argument - Assignments within functions- More advanced examples- Efficiency factors in block designs - Dropping all names in a printed array -Recursive numerical integration - Scope - Customizing the environment -Classes, generic functions and object orientation-Statistical models in R - Defining statistical models; formulae - Contrasts - Linear models - Generic functions for extracting model information - Analysis of variance and model comparison-ANOVA tables- Updating fitted models - Generalized linear models - Families -The glm() function - Nonlinear least squares and maximum likelihood models -Least squares- Maximum likelihood - Some non-standard models

#### UNIT V – GRAPHICS , PACKAGES AND OS FACILITIES

9

Graphical procedures- High-level plotting commands- The plot() function - Displaying multivariate data- Display graphics - Arguments to high-level plotting functions- Low-level plotting commands- Mathematical annotation - Hershey vector fonts- Interacting with graphics - Using graphics parameters- Permanent changes: The par() function - Temporary changes: Arguments to graphics functions - Graphics parameters list - Graphical elements - Axes and tick marks-Figure margins-Multiple figure environment -Device drivers- PostScript diagrams for typeset documents - Multiple graphics devices Dynamic graphics - Packages - Standard packages - Contributed packages and CRAN-Namespaces -OS facilities - Files and directories-Filepaths -System commands -Compression and Archives

TOTAL = 45 Hours

#### COURSE OUTCOMES:

At the end of the course the student should be able to:

- Develop simple programs in R.
- Create programs in R that illustrates arrays and matrices.
- Develop R programs that clarifies lists and probability.
- Analyze the statistical models and the implantation of R.
- Assess the value of graphics , packages and OS facilities in R.

#### REFERENCES

- W. N. Venables, D. M. Smith, "An Introduction to R", R Core Team, Version 3.6.1 (2019-07-05)(I toV units)
- Colin Gillespie, Robin Lovelace, "Efficient R Programming: A Practical Guide to Smarter Programming", O'Reilly Media, 1 edition (October 25, 2016)
- Hadley Wickham ,Garrett Grolemond , "R for Data Science: Visualize, Model, Transform, Tidy, and Import Data", O'Reilly Media; 1 edition (December 25, 2016)
- Winston Chang, "R graphics Cook Book ", O'reilly Media Inc(2013).
- Patrick Burns, "The R Inferno", lulu.com (January 12, 2012)

  
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<b>P18MCA734 - OBJECT ORIENTED ANALYSIS AND DESIGN</b>					
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>M</b>
	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>100</b>
<b>COURSE OBJECTIVES:</b>					
<b>This course will enable the student to:</b>					
<ul style="list-style-type: none"> <li>• Understand an overview of object-oriented analysis in software process.</li> <li>• Develop object-oriented models and identify implementation strategies.</li> <li>• Understand basic object oriented analysis techniques</li> <li>• Develop object oriented design models.</li> <li>• Develop testing techniques for object oriented software.</li> </ul>					
<b>UNIT I - INTRODUCTION</b>					<b>9</b>
An overview - Object basics - Object state and properties - Behavior - Methods - Messages - Information hiding - Class hierarchy - Relationships - Associations - Aggregations- Identity - Dynamic binding - Persistence - Metaclasses - Object oriented system development life cycle.					
<b>UNIT II - METHODOLOGY AND UML</b>					<b>9</b>
Introduction - Survey - Rumbaugh, Booch, Jacobson methods - Patterns - Creational - Abstract Factory - Factory Method - Behavioral - Momento - Mediator - Structural - Decorator - Facade -Concurrency Patterns -Lock - Reactor - Scheduler - Frameworks - Unified approach - Unified modeling language - Static and Dynamic models - UML diagrams - Class diagram - Use case diagrams - Dynamic modeling - Model organization - Extensibility.					
<b>UNIT III - OBJECT ORIENTED ANALYSIS</b>					<b>9</b>
Identifying Use case - Business object analysis - Use case driven object oriented analysis - Use case model - Documentation - Classification - Identifying object, relationships, attributes, methods -Super-sub class - A part of relationships Identifying attributes and methods - Object responsibility.					
<b>UNIT IV - OBJECT ORIENTED DESIGN</b>					<b>9</b>
Design process and benchmarking - Axioms - Corollaries - Designing classes - Class visibility -Refining attributes - Methods and protocols - Object storage and object interoperability - Databases- Object relational systems - Designing interface objects - Macro and Micro level processes - The purpose of a view layer interface-OOUI - MVC Architectural Pattern and Design - Designing the system.					
<b>UNIT V - QUALITY AND TESTING</b>					<b>9</b>
Quality assurance - Testing strategies - Test cases - Automated Testing Tools - Case Study - Cryptanalysis - Health Care Systems- Inventory Control System - Rational Rose Suite.					
					<b>TOTAL = 45 Hours</b>

## COURSE OUTCOMES:

At the end of the course the student should be able to:

- Apply the object oriented concepts to identify state & behavior of real world objects.
- Analyze the appropriate object oriented methodologies for solving the problem with the help of various case studies.
- Apply the concept of analysis, design & testing to develop a document for a project.
- Able to implement analysis, design & testing phases in developing a software project.
- Apply the testing strategies with the automated testing tools.

## REFERENCES

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 2008.
2. Craig Larman, Applying UML and Patterns, 2<sup>nd</sup> Edition, Pearson, 2002.
3. Brahma Dathan, Sarnath Ramnath, "Object-Oriented Analysis, Design and Implementation", Universities Press, 2010.
4. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Long man, 1999.
5. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004.
6. Martin Fowler, "UML Distilled A Brief Guide to Standard Object Modeling Language", 3rd Edition, Addison Wesley, 2003.
7. Russ Miles, Kim Hamilton, "Learning UML 2.0", O'Reilly, 2008.

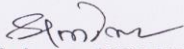


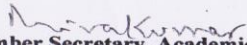
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**Sona College of Technology, Salem**  
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**Courses of Study for MCA VI Semester under Regulations 2018**  
**Branch: Master of Computer Application**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>THEORY</b>						
1	P18MCA707 ✓	Elective - E- Learning Techniques ✓	3	0	0	3 ✓
	P18MCA717 ✓	Elective - Software Project Management ✓				
<b>PRACTICAL</b>						
2	P18MCA601 ✓	Project Work ✓	0	0	12	6 ✓
<b>Total Credits</b>						<b>9 ✓</b>

Approved by

  
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**Member Secretary, Academic Council**  
**Dr.R.Shivakumar**

  
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**Dr.S.R.R.Senthil Kumar**

Copy to:-  
 Director, Sixth Semester MCA Students and Staff, COE

13.01.2021

Regulations-2018

## P18MCA707 - E - LEARNING TECHNIQUES

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Apply knowledge about modern technology for learning.
- Analyze and understand the frameworks of E-Learning.
- Learn technologies involved in e-learning application development.
- Become aware of the current business potential of e-learning based business.

### UNIT I - INTRODUCTION 9

Introduction - Understanding ICT - Impact of ICT on learning - ICT makes a difference in learning - ICT as an enabler - The relationship between ICT and e-learning - Challenges in e-learning adoption - E-learning: Definitions - Characteristic features of e-learning - Evolution - Different uses of e-learning - Academic e-learning and corporate e-learning: Differences - Introduction to mobile learning and omni- channel learning technologies.

### UNIT II - E-LEARNING FRAMEWORK AND ANALYSIS 9

Introduction - The need for a holistic framework - Significance of process orientation in the framework - Visual Communication Design - Instructional Design models- E-learning technologies Informed decision making in different contexts Getting started with analysis

### UNIT III - DESIGN AND DEVELOPMENT 9

The relationship between analysis and design - The significance of design - Developing the instructional and visual strategy - Three levels of design decision making - Bloom's taxonomy cognitive, affective and psychomotor domains - Working with content - visual strategy - The strategy in action - prototyping - The development process.

### UNIT IV - DELIVERY AND EVALUATION 9

Introduction - Significance of this phase - Delivery options - Emerging trends in e-learning delivery - Modes of delivery - Content delivery process illustrated with an LMS - Significance of the evaluation phase - Conducting summative evaluation - Kirkpatrick's model for summative evaluation.

### UNIT V - OPENSOURCE E-LEARNING APPLICATION 9

Moodle 2.0 E-Learning Course Development - Features - Architecture - Installation and configuring site - Adding static course material - Evaluating student.

**TOTAL = 45 Hours**



## COURSE OUTCOMES:

At the end of the course the student should be able to:

- Apply the Standard approach to planning and one can use in their organization.
- Work with technologies involved in e-Learning Applications.
- Design and Develop e-Learning Application and working with e- Learning tools.
- Evaluate E-Learning programmes and estimate ROI.
- Create and Deliver E-Learning courses in open source softwares.

## REFERENCES

1. Madhuri Dubey, " Effective E-learning: Design, Development and Delivery", University Press 2011 edition. (Unit 1,2,3,4)
2. Moodle 2.0 E-Learning Course Development by William Rice, 2012, Packet publishing(Unit V).
3. Bryn Holmes, John Gardner, "E-Learning - Concepts and Practice", SAGE Publications, 2012.
4. Caroline Haythornthwaite, Richard Andrews," E-learning Theory and Practice", SAGE Publications,2011
5. William Horton, "E-Learning by design", John Wiley & Sons, 2011.



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## P18MCA717 - SOFTWARE PROJECT MANAGEMENT

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Discuss the plans, methods and methodologies of project management.
- Describe the effort , estimation and activity planning of project management
- Discuss the tools and techniques of Project management.
- Examine the project monitoring and control.
- Describe the organizational behavior, decision making and different types of contracts.

### UNIT I - INTRODUCTION 8

Importance - Plans, Methods and Methodologies- Setting Objectives- Project Evaluation - Cost Benefit Evaluation- Risk Evaluation- Program Management - Resource Allocation Management -Benefit Management - Overview of Project Planning.

### UNIT II - EFFORT ESTIMATION AND ACTIVITY PLANNING 9

Problems with Over and Under Estimates- Basics- Bottom up-Top Down-Parametric Model- Expert Judgment - Activity Planning- Sequencing and Scheduling Activities- Network Planning Model- Forward, Backward Pass -Critical Path- Activity Float- Activity -on-Arrow Networks.

### UNIT III - PROJECT MANAGEMENT TOOLS AND TECHNIQUES 12

Risk Management- Categories -Framework -Evaluating Risk to Schedule- Applying PERT Technique- Monte Carlo Simulation- Critical Chain Concepts- Resource Allocation - Scheduling Resources- Creating Critical Path- Counting the Cost- Scheduling Sequence

### UNIT IV - PROJECT MONITORING AND CONTROL 9

Project Tracking - Activities Tracking -Defect Tracking - Issues Tracking - Status Reports- Milestone Analysis - Activity Level Analysis using SPC- Defect Analysis and Prevention - Pareto Analysis-Causal Analysis- Process Monitoring and Audit.

### UNIT V - MANAGING CONTRACTS AND PEOPLE 7

Types of Contract- Stages in Contract Placement- Contract Management - Understanding Behavior - Organizational Behavior- Instruction in the Best Methods - Motivation - The Oldham-Hack man Job Characteristics Model - Working in Teams- Decision Making - Organization and Team Structures.

**TOTAL = 45 Hours**

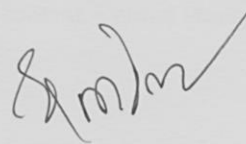
## COURSE OUTCOMES:

At the end of the course the student should be able to:

- Prioritize the evaluation of project/cost benefit / risk and manage the allocation of resources in real-time projects.
- Analyze the estimation of efforts and the planning of activities.
- Use the project management tools and techniques in real time projects.
- Implement the different ways of monitoring and controlling the projects in real time .
- Assess the organizational behavior and the different types of contract and use it in real time.

## REFERENCES

1. Bob Hughes and MikeCotterell, "Software Project Management", Fifth Edition, TATA McGraw Hill Edition, 2012.(Unit 1,2,3,5)
2. Pankaj Jalote "Software Project Management In Practice", Pearson Education, 2000.(Unit 4).
3. S. A. Kelkar," Software Project Management" PHI, New Delhi, Third Edition, 2013.
4. Walker Royce, "Software Project Management - A Unified Framework", Pearson Education,2013.
5. Ramesh Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
6. Royce, "Software Project Theory", Pearson Education, 1999.



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