MRSPTU MCA SYLLABUS 2020 Batch Onwards

							Total Credits = 23	
SEMESTER 1st		**Contact Hrs.**			**Marks**			**Credits**
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MCAPS1-101	Computer Networks	3	1	0	40	60	100	4
MCAPS1-102	Relational Database Management System	3	1	0	40	60	100	4
MCAPS1-103	Object Oriented Programming Using C++	3	1	0	40	60	100	4
MCAPS1-104	Computer Organization and Architecture	3	0	0	40	60	100	3
MCAPS1-105	Business Communications	2	0	0	40	60	100	2
MCAPS1-106	Relational Database Management Lab	0	0	4	60	40	100	2
MCAPS1-107	Object Oriented Programming using C++ Lab	0	0	4	60	40	100	2
MCAPS1-108	Business Communications and Soft Skills Lab	0	0	4	60	40	100	2
Total					380	420	800	23

								Total Credits = 23	
SEMESTER 2nd			**Contact Hrs.**			**Marks**			**Credits**
Subject Code		Subject Name	L	T	P	Internal	External	Total	
MCAPS1-201		Data Structures	3	1	0	40	60	100	4
MCAPS1-202		Operating System	3	1	0	40	60	100	4
MCAPS1-203		Discrete Mathematics	3	0	0	40	60	100	3
MCAPS1-204		Data Structures Lab	0	0	4	60	40	100	2
MCAPS1-205		Operating System Lab	0	0	4	60	40	100	2
Departmental Elective – I (Select any one)									
DE11	**MCAPD1-211**	Data Warehousing and Data Mining	3	0	0	40	60	100	3
DE12	**MCAPD1-212**	Business Intelligence & Digital	3	0	0	40	60	100	3
DE13	**MCAPD1-213**	Software Testing and Quality Assurance	3	0	0	40	60	100	3
Departmental Elective – II (*Select a combination (Theory & Lab)***)									
DE21	**MCAPD1-221**	Programming in Java	3	0	0	40	60	100	3	5
	MCAPD1-222	Programming in JAVA Lab	0	0	4	60	40	100	2	
DE22	**MCAPD1-223**	Programming with Python	3	0	0	40	60	100	3	5
	MCAPD1-224	Programming with Python Lab	0	0	4	60	40	100	2	
Total						380	420	800	23

Note:
***Students have to select a combination of subjects from **DE21/DE22** as Departmental Elective–II :*
*Note:
After 2nd Semester minimum 04 weeks Training in Institute/Industry.

	SEMESTER 3rd		Contact Hrs.			Marks			Credits
								Total Credits = 23	
Subject Code		Subject Name	L	T	P	Internal	External	Total	Credits
MCAPS1-301		Artificial Intelligence	3	1	0	40	60	100	4
MCAPS1-302		Design and Analysis of Algorithms	3	1	0	40	60	100	4
MCAPS1-303		Information and Network Security	3	0	0	40	60	100	3
MCAPS1-304		Design and Analysis of Algorithms Lab	0	0	4	60	40	100	2
MCAPS1-305		Institute /Industrial Training	--	--	--	60	40	100	2
Departmental Elective – III (*Select a combination (Theory & Lab)****)									
DE31	MCAPD1-311	LAMP Technologies	3	0	0	40	60	100	3
	MCAPD1-312	LAMP Technologies Lab	0	0	4	60	40	100	2
DE32	MCAPD1-313	Database Administration	3	0	0	40	60	100	3
	MCAPD1-314	Database Administration Lab	0	0	4	60	40	100	2
DE33	MCAPD1-315	Cloud Computing	3	0	0	40	60	100	3
	MCAPD1-316	Cloud Computing Lab	0	0	4	60	40	100	2
OP31	XXXX	Open Elective	3	0	0	40	60	100	3
Total						380	420	800	23

***Note:
*Students have to select a combination of subjects from **DE31/DE32 /DE33** as Departmental Elective–III*

	SEMESTER 4th		Contact Hrs.			Marks			Credits
								Total Credits = 20	
Subject Code		Subject Name	L	T	P	Internal	External	Total	Credits
MCAPS1-401		Theory of Computation	3	1	0	40	60	100	4
MCAPS1-402		Current Trends and Technologies	3	0	0	40	60	100	3
MCAPS1-403		Software Project	0	0	6	80	120	200	3
MCAPS1-404		Seminar	--	--	2	100	0	100	1 (Satisfactory/ Unsatisfactory)
Department Elective- IV (*Select a combination (Theory & Lab)*****)									
DE41	MCAPD1-411	Big Data	3	1	0	40	60	100	4	5
	MCAPD1-412	Big Data Lab	0	0	2	60	40	100	1	
DE42	MCAPD1-413	Dot Net Framework	3	1	0	40	60	100	4	5
	MCAPD1-414	Dot Net Framework Lab	0	0	2	60	40	100	1	
DE43	MCAPD1-415	Mobile Computing & Android	3	1	0	40	60	100	4	5
	MCAPD1-416	Mobile Computing & Android Lab	0	0	2	60	40	100	1	

	Code	Subject	L	T	P	Int	Ext	Total	Cr	
DE44	MCAPD1-417	Soft Computing	3	1	0	40	60	100	4	5
	MCAPD1-418	Soft Computing Lab	0	0	2	60	40	100	1	
Departmental Elective – V (*Select a combination (Theory & Lab)***)**									
DE51	MCAPD1-421	Machine Learning	3	0	0	40	60	100	3	4
	MCAPD1-422	Machine Learning Lab	0	0	2	60	40	100	1	
DE52	MCAPD1-423	Computer Graphics	3	0	0	40	60	100	3	4
	MCAPD1-424	Computer Graphics Lab	0	0	2	60	40	100	1	
DE53	MCAPD1-425	Fog Computing and Internet of Things	3	0	0	40	60	100	3	4
	MCAPD1-426	Fog Computing and Internet of Things Lab	0	0	2	60	40	100	1	
Total						460	440	900	20	

*****Note:*
*Students have to select a combination of subjects from **DE41/DE42/DE43/DE44** as Departmental Elective–IV*

******Note:*
*Students have to select a combination of subjects from **DE51/DE52/DE53** as Departmental Elective–V*

Bridge Course Subjects for Non-IT Background Students: -							
Note: Students have to earn minimum 02 credit in each subject during the MCA Degree							
						Total Credits = 12	
Bridge courses		**Contact Hrs.**			**Marks**		**Credits**
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MCAPS1-001	Software Engineering	3	1	0	40	60	100	4
MCAPS1-002	Digital Electronics	3	1	0	40	60	100	4
MCAPS1-003	Mathematical Foundations of Computer Science	3	1	0	40	60	100	4
Total		9	3	0	120	180	300	12

Overall

Semester	Marks	Credits
1st	800	23
2nd	800	23
3rd	800	23
4th	900	20
Total	**3300**	**89**

COMPUTER NETWORKS		
Subject Code: MCAPS1-101	**LTPC**	**Duration: 60 Hrs.**
	3104	

Course Objectives

After completion of this course, the students would be able to:

1. Independently understand basic computer network technology, data communication system and its components.
2. Identify the different types of network topologies, protocols, layers of the OSI model and TCP/IP.
3. Identify the different types of network devices and their functions within a network.
4. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

UNIT-I (17 Hrs.)

Introduction to Computer Networks - Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model.

Physical Layer - Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise, Data rate limits: Nyquist formula, Shannon Formula, Multiplexing: Frequency Division, Time Division, Wavelength Division, Introduction to Transmission Media: Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching: Circuit Switching, Message Switching, Packet Switching & their comparisons.

UNIT-II (15 Hrs.)

Data Link Layer - Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data link protocols for noisy and noiseless channels, Sliding Window Protocols: Stop & Wait ARQ, Go-back-N ARQ, Selective repeat ARQ, Data link protocols: HDLC and PPP.

Medium Access Sub-Layer - Static and dynamic channel allocation, Random Access: ALOHA, CSMA protocols, Controlled Access: Polling, Token Passing, IEEE 802.3 frame format, Ethernet cabling, Manchester encoding, collision detection in 802.3, Binary exponential back off algorithm.

UNIT-III (14 Hrs.)

Network Layer - Design issues, IPv4 classful and classless addressing, subnetting, Routing algorithms: distance vector and link state routing, Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms

UNIT-IV (14 Hrs.)

Transport Layer - Elements of transport protocols: addressing, connection establishment and release, flow control and buffering, multiplexing and de-multiplexing, crash recovery, introduction to TCP/UDP protocols and their comparison.

Application Layer - World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), Introduction to Network security.

Recommended Books

1. Andrew S. Tanenbaum, 'Computer Networks', 5th Edn., Pearson Education, **2010.**
2. Behrouz A. Forouzan, 'Data Communications & Networking', 5th Edn., Tata McGrawHill, **2012.**
3. James F. Kurose and Keith W. Ross, 'Computer Networking', 6th Edn., Pearson Education,**2013.**
4. Douglas E. Comer, 'Internetworking with TCP/IP, Volume-I', 6th Edn., Prentice HallIndia, **2013.**

RELATIONAL DATABASE MANAGEMENT SYSTEM		
Subject Code: MCAPS1-102	**L T P C**	**Duration: 60 Hrs.**
	3104	

Course Objectives

1. The course aims at providing the students through insight on few DBMS principles and practices.
2. Students will learn and implement the operations for making and using databases with help of SQL and PL/SQL.

UNIT- I (17 Hrs.)

Introduction to DBMS - Overview of DBMS, Basic DBMS terminology, Data independence. Architecture of a DBMS, Introduction to data models: Entity relationship model, Hierarchical model, Network model, Relational model.

Relational Design - Relation scheme, Codd's Rule for RDBMS, Anomalies in a database, Functional Dependency: Dependencies and Logical implications, Closure set, Testing if FD is in closure, Covers, Non redundant and Minimum cover, Canonical cover, Functional dependencies and Keys.

Normal Forms - INF, 2NF, 3NF, BCNF, Multi valued dependencies and Joined dependencies, 4NF, 5NF.

UNIT-II (15 Hrs.)

Structured Query Language - Introduction to SQL, Oracle server and Oracle database, Oracle data types, Starting SQL*Plus, querying database tables, Conditional retrieval of rows, working with null values, matching a pattern from a table, Ordering the result of a query, Aggregate Functions, Grouping the result of a query.

Querying multiple Tables - Equi Joins, Cartesian Joins, Outer Joins, Self Joins; SET Operators - Union, Intersect, Minus.

Functions - Arithmetic functions, Character functions, Date functions, and Group functions.

UNIT-III (14 Hrs.)

Data Manipulation and Control - Data Definition Language (DDL), Creating Tables, creating a Table with data from another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, dropping a Column; VIEW - Manipulating the Base table, Rules of DML Statements on Join Views, Dropping a VIEW, Inline Views.

Database security and privileges - GRANT command, REVOKE command, COMMIT and ROLLBACK.

UNIT- IV (14 Hrs.)

PL/SQL - Introduction to PL/SQL, The Advantage of PL/SQL, PL/SQL Architecture, Fundamentals of PL/SQL, PL/SQL Data types, variables and constants, Assignments and expressions, Operator precedence, referencing Non-PL/SQL variables, built in functions, conditional and iterative control, SQL within PL/SQL, writing PL/SQL code. Cursor management in PL/SQL, Cursor manipulation, Triggers, Stored procedures, Exception handling in PL/SQL, Predefined exceptions, User defined exceptions, Triggers, Stored procedures.

Recommended Books

1. Bipin C. Desai, 'An Introduction to Database System', 3rd Edn., Galgotia PublicationsPrivate Ltd, **2012**.
2. Ivan Bayross, 'SQL, PL/SQL The Programming Language of ORACLE', 2nd Edn., BPBPublication, **2003**.
3. Henry F. Korth, 'Database Systems Concepts', 5th Edn., McGraw Hill Inc, **2005**.
4. Ramez Elmasri and Shamkant B. Navathe, 'Fundamentals of Database Systems', 4th Edn., Pearson, **2003**.

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code: MCAPS1-103   **LTPC**   **Duration: 60 Hrs.**
                                      3104

Course Objectives

After completion of this course, the students would be:

1. Able to learn basics and programming skills of high level language C++.
2. Able to learn how to manage the memory by using dynamic memory management.
3. Able to learn how to use reusability concept by using inheritance and templates.
4. Able to learn the skills of handing modular approach and exceptions.

UNIT-I (17 Hrs.)

Object-Oriented Programming Concepts - Need of Object-Oriented Programming - Comparison of procedural programming and Object Oriented Programming - Characteristics of Object-Oriented Languages - C++ Programming Basics: Basic Program Construction - Data Types, Variables, Constants - Type Conversion, Operators, Library Functions - Loops and Decisions, Structures - Functions : Simple Functions, Passing arguments, Returning values, Reference Arguments. - Recursion, Inline Functions, Default Arguments - Storage Classes - Arrays , Strings

UNIT-II (15 Hrs.)

Features of Object Oriented Programming- Introduction to Classes and Objects Constructors and its types, Destructors - Passing Objects as Function arguments and Returning Objects from Functions - Operator Overloading Inheritance - Overloading Member Functions Pointers - Virtual Functions – Friend Functions, Static Functions.

UNIT-III (14 Hrs.)

Streams and Files- Streams: Classes and Errors, Disk File I/O with Streams - - Files: File Pointers - Error handling in File I/O - File I/O with member Functions - Overloading the extraction and Insertion Operators - Multi File Programs

UNIT-IV (14 Hrs.)

Templates and Exception-Templates: Function templates, Class templates - Exceptions: Need of Exceptions, keywords, Simple and Multiple Exceptions - Re-throwing Exception and Exception Specifications, Custom Exception, Introduction to Standard Template Library (STL)

Recommended Books
1. Robert Lafore, 'Object Oriented Programming in C++', 4th Edn., Waite Group, **2001**.
2. E. Balagurusamy, 'Object Oriented Programming with C++', 6th Edn., Tata McGraw Hill, **2013**.
3. R.S. Salaria, 'Object-Oriented Programming using C++', 4th Edn., Khanna BookPublishing, **2009**.
4. Bjarne Stroustrup, 'The C++ Programming Language', 3rd Edn., Addison Wesley, **1997**.
5. Herbert Schildt, 'C++: The Complete Reference', 4th Edn., McGraw Hill, **2009**.

COMPUTER ORGANIZATION & ARCHITECTURE

Subject Code: MCAPS1-104 **L T P C** **Duration: 45 Hrs.**
                  3 0 0 3

Course Objectives
1. To provide students with a solid foundation in computer design.
2. To examine the operation of the major building blocks of a computer system.
3. To introduce students to the design and organization of modern digital computers & basic assembly language.

UNIT-I (12 Hrs.)

Basic Computer Organization and Design - Common Bus System, Registers, Instruction codes, computer Instructions, Timing and Control, Instruction Cycle, Arithmetic, Logic & Shift micro operations instructions, Memory Reference Instructions, Design of Basic Computer and its working.

Programming & Controlling Basic Computer - Machine & Assembly Language, Programming Arithmetic and Logic Operations, Hardwired & Micro programmed control, Address Sequencing, Design of a control unit.

UNIT-II (10 Hrs.)

CPU Architecture - General register & stack organization, Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, ALU & Control Unit Architecture.

I/O Organization - Peripheral Devices, input-output interface, Asynchronous Data Transfer, Modes of data transfer-programmed & interrupt initiated I/O, Priority Interrupt, DMA, I/O Processors.

UNIT-III (12 Hrs.)

Memory Organization - Main Memory-Memory Address Map, Memory connection to CPU, Associative Memory-Hardware organization, Cache Memory-Levels of Cache, Associative Mapping, Direct Mapping, Set-Associative Mapping.

Parallel & Multiprocessing Environment - Introduction to parallel processing, Pipelining, RISC Architecture, Vector & array processing, multiprocessing concepts, memory & resource Sharing, Inter processor communication & Synchronization.

UNIT- IV (11 Hrs.)

Overview of Assembly Language Programming - Architecture of a typical 8-bit processor(8085 microprocessor) - Registers, Instruction Set-Data Transfer Instructions, Arithmetic Instructions, Logical Instructions, Program Control Instructions, Machine Control Instructions.

Use of an Assembly Language for Specific Programs - Simple numeric manipulations, sorting of a list and use of I/O instructions.

Recommended Books
1. M. Morris Mano, 'Computer System Architecture', Prentice Hall, **1976**.
2. William Stallings, 'Computer Organization and Architecture', 9th Edn., Pearson, **2016**.
3. P.V.S. Rao, 'Computer System Architecture', 2nd Edn., PHI, **2009**.
4. John P. Hayes, 'Computer Architecture & Organization, 3rd Edn., McGraw Hill, **2012**.
5. Stone, 'Introduction to Computer Architecture', 2nd Edn., Galgotia, **1996**.

BUSINESS COMMUNICATIONS

Subject Code: MCAPS1-105 **L T P C** **Duration - 30 Hrs.**
                  2 0 0 2

Course Objectives
1. This course is designed to give students a comprehensive view of communication, its scope and importance in business, the role of communication in establishing a favorable image of the organization.
2. The aim is to develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations.

3. This course will make student conversant with fundamentals of communication, help them honing oral, written and non-verbal communication skills and to transform their communication abilities.

UNIT- I (7 Hrs.)

Introduction to Communication - Meaning, Process, Importance of Communication in Business, Types of Information, Formal and Informal Communication, Internal and External Communication. Approaches to Effective Communication, Essentials of Effective Business Communication (7Cs model).

Written Communication - Advantages and Disadvantages, Covering letter, Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments.

UNIT –II (7 Hrs.)

Developing Reading Skills - Identify the Purpose of Reading, Factors Effecting Reading, Course How to Think and Read, Developing Effective Reading Habits, Reading Tactics and Strategies: Training Eye and Training Mind (SQ3R)

Developing Listening Skills - Importance, Purpose of Listening, Art of Listening, Factors Affecting Listening, Components of Effective Listening, Process of Listening, Principles and Barriers to Listening, Activities to Improve Listening

UNIT- III (8 Hrs.)

Oral Communication - Advantages and Disadvantages, Conversation as Communication, Art of Public Speaking, Group Communication Through Committees, Preparing and Holding

Meetings, Overcoming Stage Fright, Ambiguity Avoidance.

Departmental Communication - Meaning, Need and Types: Interview Letters, Promotion Letters, Resignation Letters, Newsletters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release

Report Writing - Structure, Types, Formats, Drafting of Various Types of Report. Nonverbal – Features, Understanding of Body Language, Posture, Gestures. Influences on Communication: Social Influences, Culture and Communication, Few Guidelines for Better Multicultural Communication, Business Etiquettes and Communication.

UNIT- IV (8 Hrs.)

Group Discussion - Nature, Uses and Importance, Guidelines for GD Presentations: How to Make Effective Presentations, Four P" S of Presentation, Structuring, Rehearsing and Delivery Methods.

Resume Writing - Planning, Organizing Contents, Layout, Guidelines for Good Resume. Interviews: Preparation Techniques, Frequently Asked Questions about How to Face an Interview Board, Proper Body Posture, projecting a Positive Image, steps to Succeed in

Interviews, Practice Mock Interview in Classrooms.

The Case Method of Course - Dimensions of a Case, Case Discussion, Usefulness of The Case Method, Training of Managers, Use The Case Method. Report Writing: Structure, Types, Formats, Preparations and Presentation.

Recommended Books
1. Lesikar, Petit & Flately, 'Lesikar's Basic Business Communication', Tata McGraw Hill.
2. Raman Meenakshi, 'Prakash Singh, Business Communication', Oxford University Press.
3. Rizvi Ashraf, 'Effective Technical Communication', Tata McGraw Hill.
4. Krizan, Buddy, 'Merrier, Effective Business Communication', Cengage Course.
5. Diwan & Aggarwal, 'Business Communication', Excel.
6. Baugh, Frayer & Thomas, 'How to write first class Business Correspondence', Viva Book
7. Taylor, 'English Conversion Practice', Tata McGraw Hill.
8. Devaraj, 'Executive Communication', Tata McGraw Hill.
9. Ober, 'Effective Bossiness Communication', Cengage Course.

SOFTWARE LAB. – I
(RELATIONAL DATABASE MANAGEMENT SYSTEM)

Subject Code: MCAPS1-106   **L T P C**
                                                   0042

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAPS1-102. Students are required to do at least 8 assignments based on the paper.

SOFTWARE LAB – II
(OBJECT ORIENTED PROGRAMMING USING C++)

Subject Code: MCAPS1-107   **L T P C**
                                       0042

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAPS1-103.

BUSINESS COMMUNICATIONS AND SOFT SKILLS LAB.

Subject Code: MCAPS1-108   **L T P C**
                                        0042

The students will have to perform the practicals in lab related to the syllabus of the subject "Business Communications" (MCAPS1-105).