Structure for
MCA
(Master of Compute Application)

College of Pure and Applied Science

Surendranagar University
Surendranagar 360 005

Implement in June – 2023

Ordinance

OMCA 1 Candidates for admission to the Master of Computer Applications (MCA 4 semesters) must have Passed BCA/ Bachelor Degree in Computer Science Engineering or equivalent Degree. OR Passed B.Sc./ B.Com./ B.A. with Mathematics at 10+2 Level or at Graduation Level (with additional bridge Courses as per the norms of the concerned University). Obtained at least 50% marks (45% marks in case of candidates belonging to reserved category) in the qualifying Examination.

OMCA 2 The duration of the course will be full time two academic years. The examination for the Master of Computer Applications course will be conducted under the semester system. For this purpose the academic year will be divided into two semesters. No candidate will be allowed to join any other full time regular course or service simultaneously.

OMCA 3 Candidates who have passed an equivalent examination from any other university or examining body and is seeking admission to the MCA course shall not be admitted without producing the eligibility certificate from the Saurashtra University.

OMCA 4 **A)** This being full time regular course, a candidate will not be allowed to join any other full time regular course or services.

B) No candidates will be admitted to any semester examination for Master of Computer Application unless the Head, Department of Computer Science, certifies it. "That he/she has attended the courses of study to the satisfaction of the Head, Department of Computer Science."

OMCA 5 Candidates desirous of appearing at any semester examination of the M.C.A. course must forward their application in the university prescribed form to the Registrar/Controller of Examinations, through the Head, Department of Computer Science on or before the date prescribed for the purpose under the relevant ordinances.

OMCA 6 No candidate will be permitted to reappear at any semester examination, which he/she has already passed. The marks of successfully completed paper will be carrying forwarded for the award of class.

OMCA 7 To pass the whole M.C.A. examination, student should clear all the four semester examinations within a period of five years from the date of his/her registration, otherwise candidate has to register him/her self again as a fresh candidate and keep attendance and appear and pass all the four semester examinations .

OMCA 8 There shall be an examination at the end of each four semesters to be known as first semester examination, second semester examination respectively, at which a student shall appear in that portion of papers practical and viva - voce

if any, for which he/she has kept the semester in accordance with the regulations in this behalf.

A candidate, whose term is not granted for whatsoever reason, shall be required to keep attendance for that semester or terms when the relevant papers are actually taught at the department.

OMCA 9 The students who is taking the admission in MCA course, and passed B.Sc./ B.Com./ B.A. with Mathematics at 10+2 Level or at Graduation Level, as per the guide lines of AICTE, such students must have to go through the additional bridge course. In this regard the, a bridge course of 3 weeks (which is organise in the first semester) is design and all such students must attend this course, there is not any examination for the bridge course, but the attendance of the students will be certified by the head of department.

OMCA 10 A candidate will be permitted to go to the next semester, irrespective he/she is failing in any number of subjects.

RMCA 1 The standard of passing the MCA degree examination will be as under

(1) To pass any semester examination for the MCA degree, a candidate must obtain at least 40% marks in internal as well as in the University Examination separately in each paper of theory, practical and project work.

(2) Class will be awarded based on Earned Grade Point, SGPA and CGPA as per rules of University

RMCA 2 Marks of internal examination, university examination will be as under

(1) Total marks of each theory course are 100 (university examination of 70 marks + internal examination of 30 marks).

(2) The syllabus of any paper must be divided into five units. Each units is assigned 14 (Fourteen) marks. Total marks of each course are 14x5=70 for university examination.

(3) Credit hours (lectures) for each unit in the course are equal (i.e. 12 hours). Total credit hours (lectures) of each course are 12x5=60.

(4) Total marks of each practical and project-viva course are 100. No internal examination marks in practical and project-viva courses.

(5) Credits for each semester is

Semester	Credits
Semester – 1	24
Semester – 2	24
Semester – 3	24
Semester – 4	24
Total credits	**96**

RMCA 3 Structure of question paper is follow:

[Time : 02:30 Hours] **[Maximum marks : 70**

Q. 1 The following questions from unit-1
- (a) Attempt the following objective questions [04]
- (b) Attempt any one out of two from the following: [02]
- (c) Attempt any one out of two from the following: [03]
- (d) Attempt any one out of two from the following: [05]

Q. 2 The following questions from unit-2
- (a) Attempt the following objective questions [04]
- (b) Attempt any one out of two from the following: [02]
- (c) Attempt any one out of two from the following: [03]
- (d) Attempt any one out of two from the following: [05]

Q. 3 The following questions from unit-3
- (a) Attempt the following objective questions [04]
- (b) Attempt any one out of two from the following: [02]
- (c) Attempt any one out of two from the following: [03]
- (d) Attempt any one out of two from the following: [05]

Q. 4 The following questions from unit-4
- (a) Attempt the following objective questions [04]
- (b) Attempt any one out of two from the following: [02]
- (c) Attempt any one out of two from the following: [03]
- (d) Attempt any one out of two from the following: [05]

Q. 5 The following questions from unit-5
- (a) Attempt the following objective questions [04]
- (b) Attempt any one out of two from the following: [02]
- (c) Attempt any one out of two from the following: [03]
- (d) Attempt any one out of two from the following: [05]

RMCA 4 The following are the courses and the scheme of examination for the MCA degree examination.

Master of Compute Application (MCA)
Bridge course

Sr No	Course code	Title of course	Duration
1	MCAB01	C fundamental and Problem solving using C	20 hours
2	MCAB02	Computer basis & web fundamentals	10 hours

Master of Compute Application (MCA)
Semester – I

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for exam		Passing standard for		Total marks	Duration of semester end examination in hrs.
					Internal	External	Internal	External		
1	MCA1010	Data structure and file structure	4	4	30	70	12	28	100	02:30
2	MCA1020	Computer organization and architecture	4	4	30	70	12	28	100	02:30
3	MCA1030	Introduction to Web designing	4	4	30	70	12	28	100	02:30
4	MCA1040	Computer network	4	4	30	70	12	28	100	02:30
5	MCA1050	Database concepts and tools	4	4	30	70	12	28	100	02:30
6	MCA1060	Practical–1 (MCA1010, MCA1030, MCA1050)	4	10	-	100	-	40	100	3
		Total	**24**	**30**	**150**	**450**	**-**		**600**	

Master of Compute Application (MCA)
Semester – II

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for exam		Passing standard for		Total marks	Duration of semester end examination in hrs.
					Internal	External	Internal	External		
1	MCA2010	Object oriented programming using Java	4	4	30	70	12	28	100	02:30
2	MCA2020	Programming in C# & forms	4	4	30	70	12	28	100	02:30
3	MCA2030	Web programming – 1	4	4	30	70	12	28	100	02:30
4	MCA2040	Operating systems	4	4	30	70	12	28	100	02:30
	Elective – 1									
5	MCA2051	System analysis and design	4	4	30	70	12	28	100	02:30
	MCA2052	Software Engineering								
	MCA2053	Cyber crime and cyber security								
6	MCA2060	Practical – 2 (MCA2010, MCA2020, MCA2030)	4	10	-	100	-	40	100	3
		Total	**24**	**30**	**150**	**450**	**-**		**600**	

Master of Compute Application (MCA)
Semester – III

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for exam		Passing standard for		Total marks	Duration of semester end examination in hrs.
					Internal	External	Internal	External		
1	MCA3010	Programming in python & machine learning	4	4	30	70	12	28	100	02:30
2	MCA3020	Mobile programming language	4	4	30	70	12	28	100	02:30
3	**Elective – 2**									
	MCA3031	Web programming – 2	4	4	30	70	12	28	100	02:30
	MCA3032	Hybrid mobile application development								
4	MCA3040	Project – 1	6	9	-	100	-	40	100	3
5	MCA3050	Practical – 3 (MCA3010, MCA3020, MCA3031 / MCA3032)	6	9	-	100	-	40	100	3
		Total	**24**	**30**	**90**	**410**	**-**		**500**	

Master of Compute Application (MCA)
Semester – IV

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for exam		Passing standard for		Total marks	Duration of semester end examination in hrs.
					Internal	External	Internal	External		
1	MCA4010	Industrial project	24	-	-	300	-	120	300	03:00

Master of Compute Application (MCA) Bridge course MCAB01 : C fundamental and Problem solving using C	
Unit	**Detail syllabus**
Unit-1	**Introduction to C Language**
	❖ Introduction to computer and programming language, Evolution of C,Advantages of C, Compiling, Linking & Debugging C programs. Algorithms, Flowchart. Character set, constants, variables and data types, expressions, evaluation of expressions, standard I/O operations, decision making, branching and loopingstructures.
Unit-2	**Manipulation of String**
	❖ Arrays and string handling, defining one, two and multidimensional arrays, manipulating arrays, declaring and initializing strings, string manipulations, use of string handling functions, Operations of Strings (String handling through built-in & UDF: Length, Compare Concatenate, Reverse, Copy, Character Search using array)
Unit-3	**Structure, union and user define function**
	❖ Structures Defining & Processing, passing to a function, Array within structure, Array of structure, Nesting of structure, Passing structure and its pointer to UDF, Introduction to Unions and it's Utilities ❖ User define functions, Defining and using functions, value parameters, recursions, nesting of function, storage class, and scope and life time of the variables. Passing pointers as parameters, call by reference, pointer to pointers, Pointer variable, pointers to arrays and string, pointer arithmetic, pointer to functions.
Basic Text & Reference Books	
(1) Programming & Data Structure using C - By: Dr. Atul Gonsai, Saurashtra Uni. (2) Publications (3) Programming in C - by E. Balaguruswami (TMH) (4) Computer programming in C - by V. Rajaraman (PHI) (5) The C programming language - by Richi&Karninghan (PHI) (6) C/C++ programmer's guide - by Pappas & Murray (BPB) (7) The spirit of C - by Mulish kooper (Jaico) (8) Understanding pointers in C - by Y. Kanetkar (BPB)	

Master of Compute Application (MCA) Bridge course MCAB02 : Computer basis & web fundamentals	
Unit	**Detail syllabus**
Unit-1	**Computer basics**
	❖ Preliminary overview of processor, memory, and hard disk ❖ Logical Architecture of Processor: Registers, ALU, Internal Bus, and Control Unit ❖ Execution of program: Fetch-decode-execute cycle. ❖ An introduction of Processor chip and memory chip ❖ I/O Controllers and Buses: Purpose and general structure of I/O Controllers, Front Side Bus (FSB), Peripheral Component Interconnect (PCI), and Universal Serial Bus (USB). ❖ Hardware: Motherboard, Graphics Adapters, Network Cards, I/O ports
Unit-2	**Web Fundamentals**
	❖ Internet, Intranet, Extranet, WWW, IP Addressing and Domain Name System, Working of Web Browser and Web Server, Web Hosting, Virtual Host, Multi Homing, Distributed Web Server Overview, Document Root, Internet Service Provider and their Services, HTTP, Mail Services, Cookies, Static Web Sites and Dynamic Web sites, Apache, IIS, POP3, IMAP and Mail clients, News Groups.

Master of Compute Application (MCA) Semester – I MCA1010 : Data structure and file structure		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction to Data Structures**	**14**
	❖ Primitive Data Structures, String Manipulation & Pattern Matching, Storage, Representation of Strings, Text Handling.	
Unit-2	**Linear Data Structures**	**14**
	❖ Arrays, Storage Structure for Arrays, Structures & Arrays of Structures, Stack, Applications of Stacks, Queues, Simulation, Priority Queues, Pointers & Linked Allocation, Linked Linear Lists, Circularly Linked Linear Lists, Doubly Linked Linear Lists, Applications of Linked Linear Lists.	
Unit-3	**Nonlinear Data Structures**	**14**
	❖ Trees , Operations on Binary Trees , Storage Representation & Manipulation of Binary Trees, Conversion of General Tree to Binary Trees , Sequential & Other Representation of Trees , Application of Trees - Manipulation of Arithmetic Expression , Multi-linked Structures - Sparse Matrices.	
Unit-4	**Sorting & Searching**	**14**
	❖ Introduction, Selection Sort, Bubble Sort, Merge Sort, Heap Sort, Quick Sort, Radix Sort, Sequential Searching, Binary Searching, Search Trees – Height Balanced, 2-3 Trees, Weight Balanced, m-ary Trees, Tree Structures, Search Methods.	
Unit-5	**Hashing and File Structure**	**14**
	❖ Hashing: The symbol table, Hashing Functions, Collision-Resolution Techniques, Dynamic hashing techniques (organizing direct files with hashing, linear hashing, virtual hashing) extendible hashing, modified dynamic hashing, spiral hashing. ❖ File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, direct files, Multi-Key file organization and access methods.	
Basic Text & Reference Books		
(1)	An introduction to data structure with applications - By Jean-Paul Sorenson (Mc graw - Hill)	
(2)	Data structure and program design in C - By Robert Knise, Bruce, P Leung, Clovis l Tonds (PHI)	
(3)	Introduction to data structure - By Bhagat Singh, Thomas L Naps (Galgotia)	
(4)	Data structure using C - By Aaron M Tenenbaum, Yedidyah Lansan, Moshe J Augenstein (PHI)	
(5)	Algorithms + Data structure = Program - By Wirth Niclaus (PH Int)	
(6)	Data Structures Using C and C++- Y. Langsam, M.J.Augenstein, A.M. Tenenbaum	

Master of Compute Application (MCA) Semester - I MCA1020 : Computer organization and architecture		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Number System & basics of computer**	**14**
	❖ Number system (Binary, Octal and Hexadecimal), Conversion from one number system to another including decimal, Operations on binary number system (Addition, subtraction, multiplication, complementation etc.), Integer and floating point representation. ❖ Block Diagram of a Personal Computer, Introduction to Processor, Memory, Bus, I/O controllers, Storage devices: Magnetic disks, optical disks, internal external hard disk, memory sticks, Input/Output devices – Mouse, keyboard, trackball, scanner, touch pad, touch screen, all kind of monitors, all kind of printers, plotter.	
Unit-2	**Gates and Boolean algebra**	**14**
	❖ Gates, Fundamentals of Boolean algebra, Truth Tables, Preparing truth table for given circuit, Preparing circuit for given truth table (SOP & POS), De Morgan's Theorems, Gate Minimization (using Boolean mathematics, using Karnaugh map technique)	
Unit-3	**Processors, Memory**	**14**
	❖ Instruction Execution, CPU organization (Stack Organization (Intro.), Instruction Formats, Addressing modes), ALU design, Overview of Microprocessor chips, memory chips & Buses, Example of a typical Microprocessor chip and a memory chip, ISA bus, PCI bus, Universal Serial Bus (USB), Architecture of PC with multiple type of buses, I/O chips. Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware, Structure of 2D Memory. Memory: Understand different type of memory (RAM, ROM, EPROM, EEPROM, Flash RAM etc.], Measuring computer memory (Bit, Byte, KB etc.).	
Unit-4	**Basic Digital Logic Circuits**	**14**
	❖ Integrated circuits, Combinational Circuits - Encoder, Decoder, Multiplexer, De-Multiplexer, comparator, Arithmetic Circuits - Half adder, full adder, binary adder, binary adder/ subtractor.	
Unit-5	**Memory elements and counters**	**14**
	❖ Flip flops (SR Flip Flop, D-Flip Flop, JK Flip Flop), Registers (Storage Registers with Parallel Input & Serial Input, Shift Registers, Universal Register),Counters (Synchronous & Asynchronous Counters, Ripple Counter, Counters with Increment & Decrement Facility)	
Basic Text & Reference Books		
(1) Structured Computer Organization, Prentice-Hall of India Pvt. Ltd. By Tanenbaum A. S. (2) Digital Computer Elect., Tata McGraw, Hill Pub. Co. Ltd. By Malvino A. P. (3) Computer Architecture & Logic Design Tata McGraw, Hill Pub. Co. Ltd. By Thomas Bartee (4) Computer Organization and Design, Prentice-Hall of India Pvt. Ltd.rogramming		

	In C (Hutchison R-MGH) by Pal Chaudhuri
(5)	Fundamental of Computers 2nd Edition, PHI By Rajaraman V –
(6)	Foundation of Information Technology – D. S. Yadav, New Age
(7)	Foundation of Computing – P. K. Sinha, BPB

Master of Compute Application (MCA) Semester - I MCA1030 : Introduction to Web designing		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Developing Web Pages Using HTML**	**14**
	❖ Introduction of HTML, HTML Tags, Heading, linking, Images, Special character and Horizontal Rules, Lists, Tables, Forms, Internal Linking, meta Elements. Designing HTML forms Webpage layout, Developing websites using the tool.	
Unit-2	**Cascading Style Sheet**	**14**
	❖ Introduction to CSS, CSS Selectors, Font attributes, Color And Background attributes, Text attributes, Border attributes, Margin attributes, Padding attributes, Font attributes, List attributes, Layers Effect, Table attributes, Float attributes, Pseudo-elements, DropDown effect, Image Opacity, Rounded Corners, Shadows, Transitions, Animation, 2D / 3D Transforms.	
Unit-3	**Introduction to Java Script**	**14**
	❖ Introduction to JavaScript, Writing JavaScript into HTML, Data Types and Literal, Type Casting, Creating Variable, Incorporating Variables in a JavaScript, JavaScript Array, Operators and Expressions in JavaScript, Special Operators, Constructor, Condition Checking, Endless Loop, Functions in JavaScript, User Define Function, Dialog Boxes, The JavaScript Document Object Model, Built in objects in JavaScript, Form used By a website, Cookies.	
Unit-4	**Built in Objects in JavaScript**	**14**
	❖ Events of JavaScript, String Built in functions, Date Built in functions, Mathematical Built in functions., Windows object Properties and methods, Document object Properties and methods, Form object Properties and methods, Form Control object Properties and method, Image object Properties, Frames object Properties and methods,	
Unit-5	**JQuery**	**14**
	❖ Introduction and Installation, Syntax, jQuery Selectors, jQuery Events, jQuery Effects (i. jQuery Hide and Show Effect, ii. jQuery Fade Effect, iii. jQuery Slide Effect, iv. jQuery Animate) , jQuery Callbacks, jQuery and HTML(jQuery Get, jQuery Set, jQuery Add, jQuery Remove, jQuery css, jQuery Width, jQuery Height), jQuery UI (Implementing Datepicker, Implementing Slider, Implementing Tabs)	
Basic Text & Reference Books		
(1)	HTML, Java Script, DHTML and PHP, BPB Publication, New Delhi by Ivan Bayross,	
(2)	The Internet, PHI, Second Edition, May 2000 Douglas E Comer:.	
(3)	"HTML and CSS: The complete Reference" by Thomas A. Powell, Fifth edition, McGraw Hill Publication.	
(4)	"The Internet Complete Reference" by Harley Hahn, Second Edition, Tata-McGraw Hill Publication.	
(5)	Web Technology Theory and Practice by M.Srinivasan, Pearson Publication.	

	World Wide Web Design With HTML, Tata McGraw Hill Publication, 2000 by Xavier C :
(6)	Web Technologies By Uttam K. Roy, Oxford Higher education publication.
(7)	"JavaScript Bible" by Danny Goodman, Michael Morrison, Paul Novitski and Tia GustaffRayl, Seventh Edition, Wiley Publishing.
(8)	"Sams Teach Yourself JavaScript in 24 hours" by Michael Moncur, Fourth edition, pearson education india.
(9)	Web Design with HTML, CSS, JavaScript and jQuery, by Jon Duckett

Master of Compute Application (MCA) Semester - I MCA1040 : Computer network		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction of Computer Network**	**14**
	❖ Introduction to Networking, Components of Networking, Different Computing Models of Network, Centralized, Distributed, Collaborative, Networking Configuration Client/Server Based, Peer to Peer Networking, Local and Wide Area Network. Network Services, File Services, Printing Services, Application Services ❖ Fundamentals of communication theory: Analog and Digital Signal, Periodic aperiodic signal, Peak Amplitude, bit rate, frequency, Decibel, bit Interval, Transmission Impairment, Attenuation, Distortion, Noise, thermal, Induced, cross talk, Impulse Noise, throughput, Propagation Speed, waveforms, bandwidth.	
Unit-2	**Networking Standards**	**14**
	❖ Introduction to Standards, Standard Organization and the OSI rules and the Communication Process. The OSI reference Model, How Peer OSI Layer Communicates, Protocol Stacks, Conceptualizing the layers of the OSI Model, OSI physical layer, OSI Data Link Layer, Concepts of OSI Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer, IEEE802 family standards.	
Unit-3	**Transmission Media & Multiplexing**	**14**
	❖ Transmission Media: Introduction to Transmission Media, Characteristics, Cost, Installation, Requirements, Bandwidth Band Usage, Attenuation and Electromagnetic Interference, Cable Media Coaxial Cable, Twisted-Pair Cable, Fiber Optic Cable, Summary of Cable. Unguided media- Infrared, Radio Waves Terrestrial Microwaves, Satellite Microwaves. ❖ Multiplexing: Frequency Division Multiplexing (FDM), Wave Division Multiplexing (WDM), Time Division Multiplexing (TDM),Statistical Time-Division Multiplexing	
Unit-4	**Connectivity Devices, Network Topologies and architectures**	**14**
	❖ Connectivity Devices: Network Adapter card, Passive Hubs, Repeaters, Active Hubs, Bridges, Two-Layer Switches, Routers, Three-Layer Switches Gateway, Brouters, Routing Algorithms, Distance Vector Routing, Link State Routing. Message Switching, Packet switching. ❖ Network Topologies and architectures: Introduction to Access Methods, Contention Polling, Token Passing, Comparing Contention and Token Passing, Demand Priority, Network Topologies, Bus Topologies, Ring Topologies and Star Topologies Mesh Topology.	
Unit-5	**TCP/IP**	**14**
	❖ TCP/IP and internetworking, related protocols, ports and sockets, The IPv4 Address Space, Classful Addressing, Classless Addressing, address structure, IP datagram. IPv6 addresses,	

	Structure.	
Basic Text & Reference Books		
(1)	B A forozon “Data communication and networking”, TMH	
(2)	Tannebaum A S “Computer networks”, PHI	
(3)	Stallings, W “Computer communication network” 4th edition PHI	
(4)	Data and computer communication -By Stallings (Macamillan)	
(5)	MCSE Training Guide- Networking essentials	

Master of Compute Application (MCA)Semester - I MCA1050 : Database concepts and tools		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Concept of Database management system**	**14**
	❖ Basic Concepts: data, database, database systems, database management system, Purpose and advantages of Database management system (over file systems), data models: Introduction; Three level architecture, Overall architecture of DBMS, Various components of a DBMS. ❖ Relational Structure – tables (relations), rows (tuples), domains, columns (attributes), Entity sets, attributes, Types of entities,Relationships, (ER) and Types of relationships, Database modeling using entity and relationships, Enhanced entity relationship diagrams , keys: super key, candidate keys, primary key, entity integrity constraints, referential integrity constraints.	
Unit-2	**Relational data model**	**14**
	❖ Relational structure – tables (relations), rows (tuples), domains, columns (attributes), Database design process, Anomalies in a database, Functional Dependencies (Lossless decomposition, Dependency preservance, Closure set of FD, Canonical Cover, Lossless Joins), Finding Candidate keys using Armstrong rules, Stages of Normalization: 1NF, 2NF, 3NF, BCNF (with general definition also) and Multi valued Dependency: 4NF & 5NF (Project Join NF) Translation of E-R schemes	
Unit-3	**Introduction to ORACLE Server & SQL**	**14**
	❖ ORACLE Server & Instances, Database Structure & Space Management, Memory & Process Structure, Schemas & Schema Objects, Client Server Architecture – Distributed Database Processing, Database Backup & Recovery, ORACLE Utility – Import , Export. ❖ Basic Data Types of ORACLE, Data Definition Language (DDL), Data Manipulation Language (DML), Transaction Processing Language (TPL), Data Constraints, Inbuilt Functions, queries, Subqueries , Join , Indexes , Views , Sequences , Synonyms	
Unit-4	**Introduction to PL/SQL**	**14**
	❖ Advantages of PL/SQL and Generic PL/SQL Block, Cursor – Implicit & Explicit Cursor , Cursor For Loop , Parameterized Cursor, Locking Strategy – Implicit & Explicit Locking , Lock Table, Exception Handling	
Unit-5	**ORACLE Database Object, Users , Privileges & Roles**	**14**
	❖ Stored Procedures & Functions, Packages, Triggers. ❖ Users – Create & Delete User , Grant & Revoke Command, Privileges – System & Object Privileges , Assigning , Viewing , Revoking System & Object Privileges Roles – Create , Grant , View & Delete the Roles	
Basic Text & Reference Books		
(1) Database System Concepts- Silberschatz, Korth, Sudarshan, Fifth Edition, McGraw Hill		

(2) Fundamentals of Database Systems, Elmsasri ,Navathe, Pearson Education, Fifth Edition (2008)
(3) An Introduction to Database Systems, C.J.Date, a Kannan, S Swaminathan,
(4) Pearson Education, Eighth Edition (2006) (Equivalent Reading)
(5) Database Systems: Concepts, Design and Applications, S. K. Singh. Pearson
(6) Education
(7) Database Management Systems, Ramakrishnan, Gehrke, McGraw Hill,Third
(8) edition
(9) Database Systems: Design, Implementation and Management, Peter Rob, Carlos
(10) Coronel, Cengage Learning, seventh edition (2007)
(11) Practice book on SQL and PL/SQL by Anjali, Amisha, Roopal and Nirav
(12) publications.
(13) Database management Systems, Leon and Leon, Vikas Publication

Master of Compute Application (MCA) Semester - I MCA1060 : Practical – 1 Based on (MCA1010, MCA1030, MCA1050)	
Detail syllabus	**Marks**
MCA1010	30
MCA1030	35
MCA1050	35

Master of Compute Application (MCA)Semester - II MCA2010: Object oriented programming using Java		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Basics of classes, objects and method in Java**	**14**
	❖ Procedural languages Vs Object Oriented approach, characteristicsof OOL, ❖ Java Environment, Java Features and support, Sample program & Compilation, Using block of code, Lexical Issues (White space, identifiers, Literals, Comments, Separators, Keyword), Java ClassLibrary, Data type, Operators, Control structures, Arrays andString Class ❖ class, object & method, Defining class, adding variables, adding methods, creating objects, Constructor, this key word, garbage collection, finalize() method, Accessing class members, methods overloading, static members, nesting of methods, Vectors & wrapper classes, Implementation of O.O.P concept in java, Inheritance, Subclasses, subclass constructor, multiple inheritance, hierarchical inheritance, overriding methods, Abstract Class, Finalvariables and methods, final classes, Method Using final to Prevent Overriding & overloading, finalize methods ,The ObjectClass, Visibility control – public access, friendly access, protectedaccess, private protected access, rules of thumb, Method Overloading, Object as parameters, Argument Passing, Returning Objects, recursion, Access control, static, final, Nested & Inner Classes, String class, Command-Line arguments.	
Unit-2	**Packages, Interfaces and Exception Handling**	**14**
	❖ Defining package, understanding CLASSPATH, Accessprotection, Importing Packages, Defining Interfaces. ❖ Exception Types, Uncaught Exceptions, Multiple catch Clauses,Nested try Statements, Throw, Throws, Finally, Java's Built-in Exceptions, Creating Your Own Exception Subclasses	
Unit-3	**Multithreaded programming**	**14**
	❖ Creating threads, run() method, new thread, thread class, stopping & blocking threads, Life cycle of thread – newborn, runnable, running, blocked, dead, waiting, sleeping, suspended, blocked, Using thread methods, thread exceptions, thread priority, synchronization, Implementing the 'Runnable' interface	
Unit-4	**Applet and Event Handling**	**14**
	❖ What is an Applet, Applet Lifecycle, Applet class, AppletContext class, passing parameters to applet, Use of java.awt.Graphics classand its various methods in an applet ❖ Event Delegation Model or Event Class Hierarchy, All classes and interfaces of Event Delegation Model, Programmes related to event handling covering all types of events	
Unit-5	**JDBC (Java Database Connectivity)**	**14**
	❖ Introduction of JDBC, JDBC Architecture, Data types in JDBC,Processing Queries, Database Exception Handling, Discuss types of drivers.	

Basic Text & Reference Books	
(1)	The Complete Reference Java, Herbert Schildt: TMH, New Delhi
(2)	Black Book: Java Programming, DreamTech Publication, New Delhi

Master of Compute Application (MCA)Semester - II MCA2020 : Programming in C# & forms		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Components of the .NET Architecture**	**14**
	❖ MS .NET Runtime, Managed / Unmanaged Code, Intermediate Language, Common Type System, MS .NET Base Class Library (BCL), Assemblies, Metadata, and Modules, Just In Time Compilation, Garbage Collection. ❖ Introduction to C# : .Net language, C# Program Console Application Development, Compiling and Executing, defining a Class, Declaring the Main () Method, Organizing Libraries with Namespaces, Using the using Keyword, Adding Comments. ❖ C# Data Types, Value Types-Primitive DataTypes, Reference Types, C# Control Structures -Using the if Statement, Using the if else Statement, Using the switch case Statement, Using the for Statement, Using the while Statement, Using the do while Statement, Using the break Statement, Using the continue Statement, Using the return Statement, Using the goto Statement.	
Unit-2	**C# Properties Delegates, Interface, Inheritance and Generics**	**14**
	❖ Delegates in C# - Single Cast, Multicast Delegates. Inheritance,Interfaces in C#, Structures in C#, Operator Overloading in C#, Using Generics in C#.	
Unit-3	**Exception, Threading**	**14**
	❖ Exception Handling in C# -Using the try Block, Using the catch Block, Using the finally Block, Using the throw Statement. ❖ Multithreading -Getting started with threads, managing thread lifetimes, destroying threads, scheduling threads, communicating data to a thread.	
Unit-4	**Introduction to ADO.NET**	**14**
	❖ Introduction to ADO.NET, ADO.NET Architecture, Understanding the ConnectionObject, Building the Connection String, Understanding the CommandObject, Understanding DataReaders, Understanding DataSets and DataAdapters, DataTable, DataColumn, DataRow, Working with System.Data. OleDb, Using DataReaders, Using DataSets	
Unit-5	**C# Windows form and Controls**	**14**
	❖ General Controls with important properties, events and Methods (Label, text box, button, listbox, combo box, check box, radio button picture box, date time picker progress bar, timer. Status strip, user defined controls), Containers (Group box, panel, split container, tab control, tab layout panel, flow layout panel),Menu and Tools Bars, Menu strip, context menu strip, status strip, tool strip, Dialogs (Colour dialog, folder browser dialog, font dialog, open file dialog, save file dialog)	
Basic Text & Reference Books		
(1) Beginning C#, Wrox Publication (2) Professional C#, Wrox Publication		

Master of Compute Application (MCA)Semester - II MCA2030 : Web programming – 1		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction to PHP**	**14**
	❖ Introduction to PHP, how PHP works, The PHP .ini File, Basic PHP syntax : ❖ PHP tags, PHP statements and whitespace comments, PHP functions, Variable types, variable names (identifiers, type strength, variable scope, super, globals, constants, variable – testing and manipulation functions), First PHP script, PHP operators, Creating Dynamic pages: Single Quotes Vs. Double Quotes, Passing variables on the URL, passing variables via the Query String, Flow Control, Arrays. ❖ PHP and HTML Forms, HTML Forms, how HTML Forms work, processing form input. ❖ String Manipulation, Formatting Strings, /Concatenation, String Manipulation Functions, Examples of string functions, working with string manipulation functions, magic quotes Reusing Code and Writing Functions, including files, require, require_once, auto_prepend_file and auto_append_file, user functions, defining and calling functions, default values, variable scope, by reference vs.. By value, form processing code organization, code organization, and conclusion.	
Unit-2	**Database connectivity, sending mail, regular expression**	**14**
	❖ Managing Data, querying a database, inserting, updating deleting, searching Records mysql functions. ❖ Sending Email with PHP, mail(), shortcomings of mail(), PHPMailer, Sending a password by Email ❖ Regular expressions, Regular Expression Syntax, Start and End (^$), Number of occurrences (? +*{}), Common Characters (.\d\D\w\W\s\S), Grouping ([]), Negation (^), Subpatterns(()), Alternatives(|), Escape Character (\), Form Validation functions with regular expressions.	
Unit-3	**Session, cookies & File system**	**14**
	❖ Session Control and /Cookies , Sessions, Configuring Sessions, Session ❖ Functions, Cookies, Authentication with Session Control. ❖ File System Management, Opening a file, fopen(), Reading from a file, fgets(), writing to a file, fwrite(), writing to a file, file locking, flock(), uploading files via an HTML form, getting file information, more file functions, directory Functions getting a directory listing, creating a resume management page.	
Unit-4	**Ajax and XMLDOM**	**14**
	❖ Ajax with PHP, Ajax overview, Ajax Technology Stack, Ajax Implementations, Installing and configuring HTML Ajax Pear Module, Ajax Server, Ajax Client. ❖ PHP XML Support, Simple XML Objects, executing X path Queries, DOM	

	❖ Interoperability, Using X path, Installing and Configuring LIBXSL, Applying server side XSL Transformations, Using XML in N-Tier Architecture, Mixing PHP Objects and XML.	
Unit-5	**Web services**	**14**
	❖ PHP Web Services, Web service Technology Stack, SOAP Soup, Web services with PHP, Installing NuSOAP, Building a SOAP SERVER, Consuming a Web service, Generating WSDL Dynamically, Understanding Generated WSDL, WSDL and SOAP Proxies. ❖ Web Services with JSON.	

Basic Text & Reference Books

(3) Beginning JavaScript 2nd Edition – Wrox
(4) Beginning PHP5, Apache, Mysql Web Development – Wrox
(5) PHP Bible, 2nd Edition :Tim Converse, Joyce Park
(6) PHP manual
(7) Beginning Ajax – Wrox
(8) PHP Bible, 2nd Edition :Tim Converse, Joyce Park
(9) Beginning PHP5, Apache, Mysql Web Development – Wrox
(10) XML Bible – Wiley

Master of Compute Application (MCA)Semester - II MCA2040: Operating systems		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction**	**14**
	❖ What is OS, General categories of OS – Desktop system, Multiprocessor systems, Distributed systems, clustered systems, Real time systems, Handheld systems ❖ Computer system structure - I/O structure, Hardware protection ❖ Operating system concepts, Services, System calls for (process management, signaling, file management, directory management, protection, time management), Operating system structure (monolithic system, layered system, virtual machine, client server model)	
Unit-2	**Process management**	**14**
	❖ Process concepts - States of process, Scheduling, Threads – User & Kernel Threads, Single & Multi-Threaded, Processes, Multi-Threading Models, Inter process communication (race condition, critical selection, mutual exclusion with busy waiting, sleep and wakeup, semaphore, monitors, message passing), ❖ Process scheduling: Round robin scheduling, priority scheduling, multiple queue, shortest job first, guaranteed scheduling, lottery scheduling, real time scheduling, two level scheduling, policy versus mechanism.	
Unit-3	**Deadlock and Memory Management**	**14**
	❖ Deadlocks: criteria for deadlock arise, resources, principles of deadlock, detection and recovery, deadlock prevention, deadlock avoidance – The Banker's algorithm for a single resource, resource trajectories, Bankers algorithm for multiple resources. ❖ Memory management: Logical and physical address, Swapping, Contiguous Memory, Allocation, Paging, Segmentation, Segmentation with paging, Virtual memory – Demand Paging, Page replacement algorithms	
Unit-4	**File Management**	**14**
	❖ File Concept – Access Methods, Directory Structure ❖ File System Structure ❖ Allocation methods ❖ Free space management, Directory implementation ❖ Overview of I/O system – Application I/O Interface, I/O hardware, kernel I/O subsystem ❖ Disk scheduling algorithms	
Unit-5	**Security and Applications of OS**	**14**
	❖ Security: The security environment, famous security flaws, generic security attacks, design principles for security, user authentication ❖ Protection: Protection domains, access control lists, capabilities, convert channels ❖ The dining philosophers problem ❖ The reader and writers problem	

	❖ The sleeping and barber problem ❖ The Ostrich algorithm for deadlock	

Basic Text & Reference Books

(1) Operating Systems Concepts. Addision – Wesley By Silberschetz A and Galvin
(2) Operating Systems design and implementation - PHI By Andrew S Tanenbaum,Albert S Woodhull.
(3) Operating Systems.McGraw Hill Book Co. By Madnick S. & Donovan J. J.
(4) Silberschetz A and Galvin : Operating Systems Concepts. Addision - Wesley.
(5) Madnick S. & Donovan J. J. : Operating Systems.McGraw Hill Book Co.

Master of Compute Application (MCA) Semester – II(Elective-1) MCA2051: System analysis and design		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Overview of the System Analysis & Design System**	**14**
	❖ System, Subsystem, Characteristics of system, Information System, Categories of Information system, System Analysis and Design, Types of User, Functions of System Analysts, System Development Strategies – Classical Method(SDLC), Structured Analysis Development Method, System Prototype Method, Project Proposals -Reasons for Project Proposal, Source of Project Request	
Unit-2	**Preliminary investigation, feasibility study, Requirement analysis**	**14**
	❖ Fact Finding Techniques, Tools for Analysis – Decision Trees,Decision Tables, Structured English, data flow diagram and data dictionary.	
Unit-3	**Input & output design**	**14**
	❖ Objective of Output, Types of Output, Types of Presenting Information, Designing Printed Output (Printed Reports, printed output Method, special forms, multiple copies), Objective of input design, Data capturing guidelines, Designing of source document,layout, captions, Coding Techniques (Classification Code. Functions code, Sequence code, significant digit subset code, mnemonic code etc.) Input Validations and tests	
Unit-4	**Database- File Design**	**14**
	❖ System development in a database environment, Design ofDatabase, Top-Down structure of modules, Coupling & Cohesion, Span of control, Module size, Shared modules, Software Designtools - Structured flowcharts, HIPO, Warnier diagrams.	
Unit-5	**Testing and Implementation Methods**	**14**
	❖ Unit test, system test, peak load test, storage test, performancetime test, recovery test, verification, validations and certifications ❖ System Implementation methods (Parallel, direct cut-over, Pilotapproach, phase in) Training & Training Methods	
Basic Text & Reference Books		
(1) Analysis and design of information system – By Jams A Seen (TMH) (2) Structured Analysis and Design, Yourdon E. and Constantine L. L: YourdonPress, New York.		

Master of Compute Application (MCA) Semester – II(Elective-1) MCA2052: Software Engineering		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction**	**14**
	❖ Software and role of software, types (nature) of software, Software Engineering-A Layered Technology, Process Framework, Capability Maturing Model Integration (CMMI), Process Model – Waterfall Model, Incremental Process Model, RAD Model, Evolutionary Process Models-Prototyping,` Spiral Model, Concurrent Development Model, Specialized Process Model – Component-Based Development , Formal Methods Model, Aspect-Oriented Software Development. Agile Process, Agile Process Model – Extreme Programming, Adaptive Software Development, Dynamic Systems Development Method, Scrum, Crystal, Feature Driven Development, Agile Modeling.	
Unit-2	**Software Requirement**	**14**
	❖ Requirement Engineering Tasks, Requirements EngineeringProcess, Eliciting Requirements, Elaborating Requirements, Negotiating Requirements, Validating Requirements.	
Unit-3	**Analysis Model**	**14**
	❖ Requirements Analysis, Elements of Analysis Model, DataModeling Concepts, Object Oriented Analysis, Scenario Based Modeling, Flow- Oriented Modeling, Class Based Modeling,Behavioral Model.	
Unit-4	**Software Designing and testing**	**14**
	❖ Design Concepts, Design Model, Pattern Based Software Design, Designing Class-Based Component, Conducting Component Level Design. ❖ Test Strategies for Conventional Software, Test Strategies for object Oriented Software, Validation Testing, System Testing, Debugging, Black Box Testing, White Box Testing, Control Structure Testing.	
Unit-5	**Object Oriented Analysis & Design Tool – UML**	**14**
	❖ Fundamental of UML – Associations, Multiplicity, Qualified Association, Reflexive Association, Inheritance & Generalization,Dependencies ❖ Component of UML – Class Diagram, Object Diagram, Use Case Diagram, Activity Diagram	
Basic Text & Reference Books		
(1) Software Engineering, McGraw-Hill Publication by Roger Pressman (2) An Integrated Approach to SE, Narosa Publication by Pankaj Jalote (3) Teach Your Self UML in 24 Hours, Techmedia Publication by Joseph Schmuller		

Master of Compute Application (MCA) Semester – II(Elective-1) MCA2053: Cyber Crime and cyber security		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction to Cybercrime**	**14**
	❖ Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? ❖ Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses , Software Piracy, Computer Sabotage, E- Mail Bombing/Mail Bombs, Usenet Newsgroup as the Source of Cybercrimes , Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft	
Unit-2	**Cyberoffenses: How Criminals Plan Them**	**14**
	❖ Introduction, Categories of Cybercrime, How Criminals Plan theAttacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining andMaintaining the System Access), Social Engineering, and Classification of Social Engineering, ❖ Cyberstalking: Types of Stalkers, Cases Reported on cyberstalking, How Stalking Works? Real-Life Incident of Cyberstalking, Cybercafe and ❖ Cybercrimes, Botnets: The Fuel for Cybercrime, Botnet, Attack Vector Cloud Computing: Why Cloud Computing? , Types of Services, Cybercrime and Cloud Computing	
Unit-3	**Cybercrime: Mobile and Wireless Devices**	**14**
	❖ Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era: Types and Techniques of Credit Card Frauds, 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, RAS Security for Mobile Devices, Media Player Control Security, Networking API Security for Mobile Computing Applications, Attacks on Mobile/Cell Phones: Mobile Phone Theft, Mobile Viruses, Mishing, Vishing, Smishing, Hacking Bluetooth, Mobile Devices: Security Implications for Organizations: Managing Diversity and Proliferation of Hand-Held Devices, Unconventional/Stealth Storage Devices Threats through Lost and Stolen Devices, Protecting Data on Lost Devices, Educating the Laptop Users Organizational Measures for Handling Mobile Devices-Related Security ❖ Issues: Encrypting Organizational Databases, Including Mobile Devices in Security Strategy, Organizational Security Policies and	

	Measures in Mobile Computing Era: Importance of Security Policies relating to Mobile Computing Devices, Operating Guidelines for Implementing Mobile Device Security Policies, Organizational Policies for the Use of Mobile Hand-Held Devices, Laptops: Physical Security Countermeasures	
Unit-4	**Tools and Methods in Cyber crime & Phishing and Identity Theft**	**14**
	❖ Introduction, Proxy Servers and Anonymizers, Phishing: How Phishing Works? Password Cracking: ❖ Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords, Keyloggers and Spywares: Software Keyloggers, Hardware Keyloggers, Antikeylogger, Spywares, ❖ Virus and Worms: Types of Viruses, Trojan Horses and Backdoors: Backdoor, How to Protect from Trojan Horses and Backdoors, Steganography: Steganalysis, DoS and DDoS Attacks: DoS Attacks, Classification of DoS Attacks, Types or Levels of DoS Attacks, Tools Used to Launch DoS Attack, DDoS Attacks, How to Protect from DoS/DDoS Attacks, SQL Injection: Steps forSQL Injection Attack, How to Avoid SQL Injection Attacks, Buffer Overflow: Types of Buffer Overflow, How to Minimize Buffer Overflow, Attacks on Wireless Networks: Traditional Techniques of Attacks on Wireless Networks, Theft of Internet Hours and Wi-Fi-based Frauds and Misuses, How to Secure the Wireless Networks ❖ Introduction, Phishing: Methods of Phishing, Phishing Techniques, Spear Phishing, Types of Phishing Scams, Phishing Toolkits and Spy Phishing, Phishing Countermeasures, Identity Theft (ID Theft): Personally Identifiable Information(PII), Types of Identity Theft, Techniques of ID Theft, Identity Theft- Countermeasures, How to Protect your Online Identity	
Unit-5	**Cybercrimes and Cyber security: The Legal Perspectives**	**14**
	❖ Introduction, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act: Admissibility of Electronic Records: Amendments made in the Indian ITA 2000, Positive Aspects of the ITA 2000, The Weak Areas of the ITA 2000, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act Amendments to the Indian ITA 2008: Overview of Changes Made to the Indian IT Act, Cyber cafe- Related Matters Addressed in the Amendment to the Indian IT Act, State Government Powers Impacted by the Amendments to the Indian IT Act, Impact of IT Act Amendments Impact Information Technology Organizations, Cybercrime and Punishment, Cyber law, Technology and students: Indian Scenaris	

Basic Text & Reference Books

(1) Robert Jones, "Internet Forensics: Using Digital Evidence to Solve ComputerCrime", O'Reilly Media, October, 2005

(2) Chad Steel, "Windows Forensics: The field guide for conducting corporatecomputer investigations", Wiley India Publications, December, 2006

Chapter wise Coverage from the Text Book:

Master of Compute Application (MCA) Semester - II MCA2060 : Practical – 2 Based on (MCA2010, MCA2020, MCA2030)	
Detail syllabus	**Marks**
MCA2010	35
MCA2020	35
MCA2030	30

Master of Compute Application (MCA)Semester - III MCA3010: Programming in python & machine learning		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction**	**14**
	❖ Introduction to Python: The basic elements of Python ,Features & Installation of Python, expressions and numerical data types, Variables and identifiers, IDLE, input output statements, keywords, operations Arithmetic, Relational, Unary, Assignment etc. ❖ Branching and Control Structure: Branching programs, Control Structures, Iteration, Strings and Input, Built-In String Functions. Python Input and Output Functions, Import command.	
Unit-2	**Functions & Modules**	**14**
	❖ Functions: Defining a Function, Calling a Function, Returning Results from a Function, Returning Multiple Values from a Function, Functions are First Class Objects, Pass by Object Reference, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default Arguments, Variable Length Arguments, Local and Global Variables, The Global Keyword, Passing a Group of Elements to a Function, Recursive Functions,Anonymous Functions or Lambdas. ❖ Modules: Module definition, need of modules, Creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.	
Unit-3	**Python Native Data Types & Files**	**14**
	❖ Python Native Data Types: Lists, Tuples, Sets, Dictionary, Arrays Tuples — Unchanging Sequences of Data, Lists — hangeable Sequences of Data, Dictionaries — Groupings of Data Indexed by Name, Special String Substitution Using Dictionaries, Arrays ,treating a String Like a List, Working with Sets. ❖ Files: Files, Types of Files in Python, opening a File, closing a File, Working with Text Files, Reading and Writing to/from File, Containing Strings, Knowing Whether a File Exists or Not.	
Unit-4	**Classes and Object-Oriented Programming**	**14**
	❖ Classes and Object-Oriented Programming: The concept of OOPS in Python, designing classes, creating objects, accessing attributes, editing class attributes, Abstract Data Types and classes, Inheritance (Single, Multi-Level, Hierarchical, Multiple), Encapsulation and polymorphism (method overloading andoverriding) ❖ Exception Handling: Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python.	
Unit-5	**Advanced Topics & Data automation:**	**14**
	❖ Data Frame (Creating Data Frame from an Excel Spreadsheet, Creating Data Frame from .csv Files, Creating Data Frame from a Python Dictionary, Creating Data from Python List of Tuples, Operations on Data Frames), Openpyxl package, Excel sheet	

	management, creating rows, column, sheet, charts etc. ❖ **Machine Learning:** What is machine learning? Application of Machine learning, machine learning application steps, useof numpy, pandas, MatPlotLib, scikit-learn library. Use of Jupyter and notebook along with anaconda.	

Basic Text & Reference Books

(1) https://docs.python.org/3/
(2) Learn to Programwith Python 3A Step-by-Step Guideto ProgrammingSecondEdition,Irv Kalb
(3) Introduction to Computation and Programming Using Python byJohn V Guttag
(4) Learning Python By Mark Lutz,5th edition O'Reilly Publication
(5) Wesley J Chun, Core Python Applications Programming, 3rd Edition.Pearson
(6) Core Python Programming, Second EditionBy Wesley J. Chun, Prentice Hall
(7) Python Crash Course, by by Eric Matthes2nd edition,William Pollock
(8) Python Essential Reference Sams Publishing, David Beazley,Third Edition
(9) Python for Data Analysis, Wes McKinney, O'Reilly
(10) Pandas for Everyone: Python Data Analysis, Daniel Y Chen, Pearson

Master of Compute Application (MCA)Semester - III MCA3020: Mobile programming language		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Android Introduction**	**14**
	❖ Android versions, features of android, architecture of android, android devices, required tools (Android SDK, Installing the android SDK tools, configuring the android SDK manager, Introduction android studio, android development tools (ADT), creating android virtual devices) ❖ Activities: The life cycle of an activity, Applying styles and themes to an activity, hiding the activity title, display a dialog window, displaying a progress dialog, linking activities using intents, resolving intent filter collision, returning results from an intent, parsing data using an intent object, ❖ Fragments: Adding fragments dynamically, life cycle of fragment, interactions between fragments, calling built in applications using intents, intent objects, intent filters, categories and notifications.	
Unit-2	**Android user interface**	**14**
	❖ Components of screen: views and ViewsGroups, LinearLayout, AbsoluteLayout, TableLayout, RelativeLayout, FrameLayout, ScrollView. Anchoring view, resizing and repositioning. ❖ Managing changes to screen orientation, Persisting state information during changes in configuration, detecting orientationchanges, Controlling the orientation of the activity, detectingorientation changes, controlling the orientation f the activity. ❖ Action bar, adding action items to the action bar, customizing the action items and application icon. ❖ Creating the user interface programmatically, UI notifications, Overriding of method of an activity, registering events for views	
Unit-3	**Designing user interface with views**	**14**
	❖ Basic views : TextView, Button, ImageButton, EditText, checkbox, ToggleButton, RadioButton, RadioGroup, ProgressBar,AutoCompleteTextView ❖ Picker view: TimePicker, DatePicker ❖ List view: ListView, Spinner view, ListFragment,DialogFragment, PreferenceFragment, ❖ Displaying picture: Gallery and ImageView, ImageSwitcher, Creating helper methods, options menu, context menu,analogClock, DigitalClock and WebView	
Unit-4	**Android storage techniques**	**14**
	❖ Saving and loading user preferences, accessing preferences usingan activity, modifying preferences values using programmatically,changing the default name of the preference file. ❖ Persisting data to files: saving to internal storage / external storage (SD card), storage options. ❖ Database: Creating the database, DBAdapter helper class. Adding contact to table, single/multiple retrieving content from table, update and deleting the contact, upgrading the database.	

Unit-5	Android services, Web App. Integration Techniques & Deployment	14
	❖ Phone: Call, Messaging, location based service, Network Connectivity, Web API, Maps, GPS, Notification, Alarm. ❖ JSON Parsing, XML Parsing, DOM Parsing. ❖ Developing android services, Publish Android Application.	

Basic Text & Reference Books

(1) Beginning Android application development – by Wei-Meng Lee, Wiley-IndiaEdition.
(2) Learning Android – By Marko Gargenta, O'reilly
(3) Lauren Darcey and Shane Conder, "Android Wireless Application Development",Pearson Education, 2nd ed. (2011)
(4) Reto Meier, "Professional Android 2 Application Development", Wiley India PvtLtd (2011)
(5) Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd(2009)
(6) Sayed Y Hashimi and Satya Komatineni, "Pro Android", Wiley India Pvt Ltd
(7) Professional android sensor programming – Greg Miletter, Adam Stroud, Wiley-India

Master of Compute Application (MCA)
Semester – III(Elective – 2)
MCA3031: Web programming – 2

Unit	Detail syllabus	Marks
Unit-1	**Introduction to WordPress**	**14**
	❖ Foundations Of A WordPress -Based Website (Understanding and Using domain names, WordPress Hosting Options, Installing WordPress on a Dedicated Server, UnderstandingDirectory Permissions) ❖ Basics Of The WordPress User Interface (Understanding the WordPress Dashboard Pages, Tags, Media and Content Administration, Core WordPress Settings) ❖ Working With WordPress Themes (Understanding the Structure of WordPress Themes, Finding Themes and Choosing the Right One, Installing and Configuring Themes, Editing and Customizing Themes, Using Theme Frameworks) ❖ Managing Multimedia With WordPress (Organizing Pictures, Videos and Downloadable Files in WordPress, Alternatives to Using WordPress for Managing Media Online, Using WordPress Photo Galleries)	
Unit-2	**Creating WordPress Plugins**	**14**
	❖ Finding And Using WordPress Plugins (Finding and Installing Plugins Quickly and Easily, Upgrading WordPress Plugins,Recommended WordPress Plugins) ❖ Creating Our Own Plug in(Registration of Plugin, Activation ofplugin, Interaction with Database, Insertation of data) ❖ WordPress Content Management (Understanding Posts Versus Pages, ❖ Organizing Posts with Categories, Connecting Posts Together with Tags, Custom Post Types, Managing Lists of Links)	
Unit-3	**Advance WordPress Functions and other functionality**	**14**
	❖ WordPress – User Define Function ❖ Advance Functions (add action(), add filter(), add_shortcode(),do_shortcode(), register_nav_menu()) ❖ Custom Post Types (register_post_type(), register taxonomy(),Display custom Post Type & Taxonomy) ❖ Function file. ❖ Customizing the Sidebar (Registering New Sidebars AddingWidgets to Sidebars Installing an Image Widget) ❖ SEO Plugins (All In one SEO,YOAST) ❖ Google Translator ❖ WordPress Security ❖ RSS and social media	
Unit-4	**Introduction to Laravel**	**14**
	❖ Need for framework, Main features of larvae, Structure ofLaravel Application. ❖ How composer work, Installing and configuration of composer,	

	Installing and Configuration of Laravel, Creating new laravel application Using built in development server, ❖ Writing the first routes (Restricting the route parameter, Catching the missing routes, ❖ Forms (General Forms , Fields ,Buttons , Security) ❖ URL Generation (The Current URL ,Generating Framework URLS , Asset URLs , Generation Shortcuts)	
Unit-5	**Laravel Advance Concept**	**14**
	❖ Artisan Command Line Tool ❖ Blade Template(Template inheritance, Master layout, Extending the master layout) ❖ Validation (Controller Validation , Form Request Validation , Working with Error Messages , Error Messages and Views , Available Validation Rules , Custom Error Messages , Custom Validation Rules) ❖ Migrations (Basic Concept , Creating Migration , Rolling Back, Migration Tricks) ❖ Authentication ❖ Authorization	

Basic Text & Reference Books

(1) WordPress for Beginners: A Visual Step-by-step Guide to Mastering WordpressPaperback –by Dr. Andy Williams.
(2) Professional WordPress design and development by Brad Williams, DavidDamstra, Hal Stern Published by wrox
(3) Laravel 5 Essentials by Martin Bean
(4) Online Laravel 5.2 Documentation (https://laravel.com/docs/5.2)

Master of Compute Application (MCA)
Semester – III(Elective – 2)
MCA3032: Hybrid mobile application development

Unit	Detail syllabus	Marks
Unit-1	**Introduction to Angular JS**	**14**
	❖ Introduction to Angular JS, general features, core features, parts of Angular JS, Angular JS MVC architecture, Page loading mechanism of Angular Js code in the browser, Creating and executing Angular JS application, Integration of Angular JS with HTML, AngularJS expression, AngularJS Numbers, AngularJS String, AngularJS Objects, AngularJS Arrays, AngularJS module, AngularJS Controller, AngularJS Directives (ng-app, ng-init, ng- model, ng-repeat), creating new directives, Restriction in directives, two way binding, validating user input, ng-controller and its method (controller in method and controller in external file), AngularJS Scope, Root Scope, ❖ AngularJS Filters (currency, data, filter, json, limitTo, lowercase, number, orderBy, uppercase) adding filter to expression, directives, Filter or sort an array based on user input, custom filter,	
Unit-2	**AngularJS service, table and AngularJS SQL**	**14**
	❖ AngularJS services ($location, $http, $timeout, $interval) Creating custom services, short cut methods of $http service (.delete(), .get(), .head(), .jsonp(), .patch(), .post(), .put()), http responseobject properties. ❖ Creating AngularJS table (simple table, css style sheet, ordered by filter, $index, $even, $odd ❖ AngularJS select (ng-options), AngularJS SQL (connecting with PHP MySQL running on server side), AngularJS HTML DOM (ng-disabled, ng-show, ng-hide, ng-click), AngularJS events (ng- blur, ng-change, ng-click, ng-copy, ng-cut, ng-dblclick, ng-focus, ng-keydown, ng-keypress, ng-keyup, ng-mousedown, ng-mouseenter, ng-mouseleave, ng-mousemove, ng-mouseover, ng-mouseup, ng-paste, $event object)	
Unit-3	**AngularJS Forms and its applications**	**14**
	❖ AngularJS forms: Input controls, data-binding, validation(required, E-mail), input state ($untouched, $touched, $prisine, $dirty, $invalid, $valid), form state ($pristine, $dirty, $invalid, $valid, $submitted), css classes to forms and input fields for theirstate.	
Unit-4	**Ionic basis**	**14**
	❖ Introduction, ionic framework features, ionic framework advantages and limitation, Installation of ionic, environment setup, creating apps (Tabs app, blank apps, side menu apps), testing the app in browser, project folder structure. ❖ Ionic CSS components: Ionic- (color, content, header, footer, buttons, list cards, forms, toggle, checkbox, radio button, range, select, tabs, grid icons, padding)	
Unit-5	**Ionic javascripts component and advance concept**	**14**

	❖ Ionic Javascript – (Action sheet, backdrop, content, forms, events, header, footer, keyboard, list, loading model, navigation, popover, popup, scroll, side menu, side box, tabs) ❖ Advanced concept: ionic – camera, ionic – native audio, ionic – geolocation, ionic – splash screen	

Basic Text & Reference Books

(1) https://www.javatpoint.com/nodejs-tutorial
(2) https://www.tutorialspoint.com/html5/index.htm
(3) https://www.tutorialspoint.com/ionic
(4) https://www.w3schools.com/angular/
(5) AngularJS - O'Reilly Media By Brad Green, Shyam Seshadri
(6) Getting Started with Ionic By: Rahat Khanna - Packt Publishing
(7) Learning Ionic – Arvind Ravulavaru – PACKT Publishing
(8) Ionic in Action: Hybrid Mobile Apps with Ionic and AngularJS - Jeremy Wilken, Manning Publications, 2015

Master of Compute Application (MCA) Semester - III MCA3040 : Project – 1	
Detail syllabus	**Marks**
In house development of the project	100

Master of Compute Application (MCA) Semester - III MCA3050 : Practical – 3 Based on (MCA3010, MCA3020, MCA3031 / MCA3032)	
Detail syllabus	**Marks**
MCA3010	35
MCA3020	35
MCA3031/MCA3032	30

Master of Compute Application (MCA) Semester - IV MCA4010 : Industrial project	
Detail syllabus	**Marks**
Project work to be done in industry	300