SAURASHTRA UNIVERSITY

RAJKOT

(ACCREDITED GRADE "A" BY NAAC)

FACULTY OF SCIENCE

Syllabus for

MASTER OF COMPUTER APPLICATION

Choice Based Credit System

With Effect From: 2016-17

- **Program Outcome:**

MCA program is a professional program. It is a technical course. The program is aimed to design in such a way that the students can be absorbed directly in the industries. During their studies, students has to go through a variety of subjects which are directly or indirectly useful in the industry. They have to go through a lot of practical work as well as project work. In the last semester they have to go to the industry for their project work and they have to work as per the requirement of the industry. Hence the program outcome is ob oriented.

Some of the students starts their own development and turns into a small software development industries. So the course is more focus on "Atma nirbhar".

- **Program Specific Outcome**

During the MCA course, students have to go through a variety of subjects, i.e. computer fundamentals, programming, mathematics and many more. The students are developed in such a way that they are able to work in area where computer works as a tool. They can do analysis, design development and implementation of the work, which help the society.

1

Ordinance

OMCA 1   Candidates for admission to the Master of Computer Applications (MCA 6 semesters) must have a bachelor's degree of minimum three years duration in any discipline with at least second class with minimum 50% and with mathematics or business mathematics as a subject at higher-secondary (10+2) level or as per GCET norms.

OMCA 2   The duration of the course will be full time three 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 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 carry forwarded for the award of class.

OMCA 7   To pass the whole M.C.A. examination, student should clear all the six 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 six semester examinations .

OMCA 8   There shall be an examination at the end of each six 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 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   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 interval 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
Semester – 5	24
Semester – 6	24
Total credits	**144**

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]

3

| | (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)
Semester – I

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal & External exam	Passing standard for internal & External Exam	Total marks	Duration of semester end examination in hrs.
1	P1010	Introduction to programming using C	4	4	30+70	12+28	100	02:30
2	P1020	Computer Organization and Architecture	4	4	30+70	12+28	100	02:30
3	P1030	Internet and Introduction to Web Technology	4	4	30+70	12+28	100	02:30
4	P1040	Database concepts and tools	4	4	30+70	12+28	100	02:30
5	P1050	Comp. oriented Numerical & statistical method	4	4	30+70	12+28	100	02:30
6	P1060	Practical–1 (P1010,P1030,P1040,P1050)	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 internal & External exam	Passing standard for internal & External Exam	Total marks	Duration of semester end examination in hrs.
1	P2010	Object oriented programming using C++	4	4	30+70	12+28	100	02:30
2	P2020	Computer network	4	4	30+70	12+28	100	02:30
3	P2030	System analysis and design	4	4	30+70	12+28	100	02:30
4	P2040	Operating system and Linux programming	4	4	30+70	12+28	100	02:30
5	P2050	Data structure and algorithm	4	4	30+70	12+28	100	02:30
6	P2060	Practical–2 (P2010 ,P2040 ,P2050)	4	10	100	40	100	3
		Total	**24**	**30**	**150+450**	**-**	**600**	

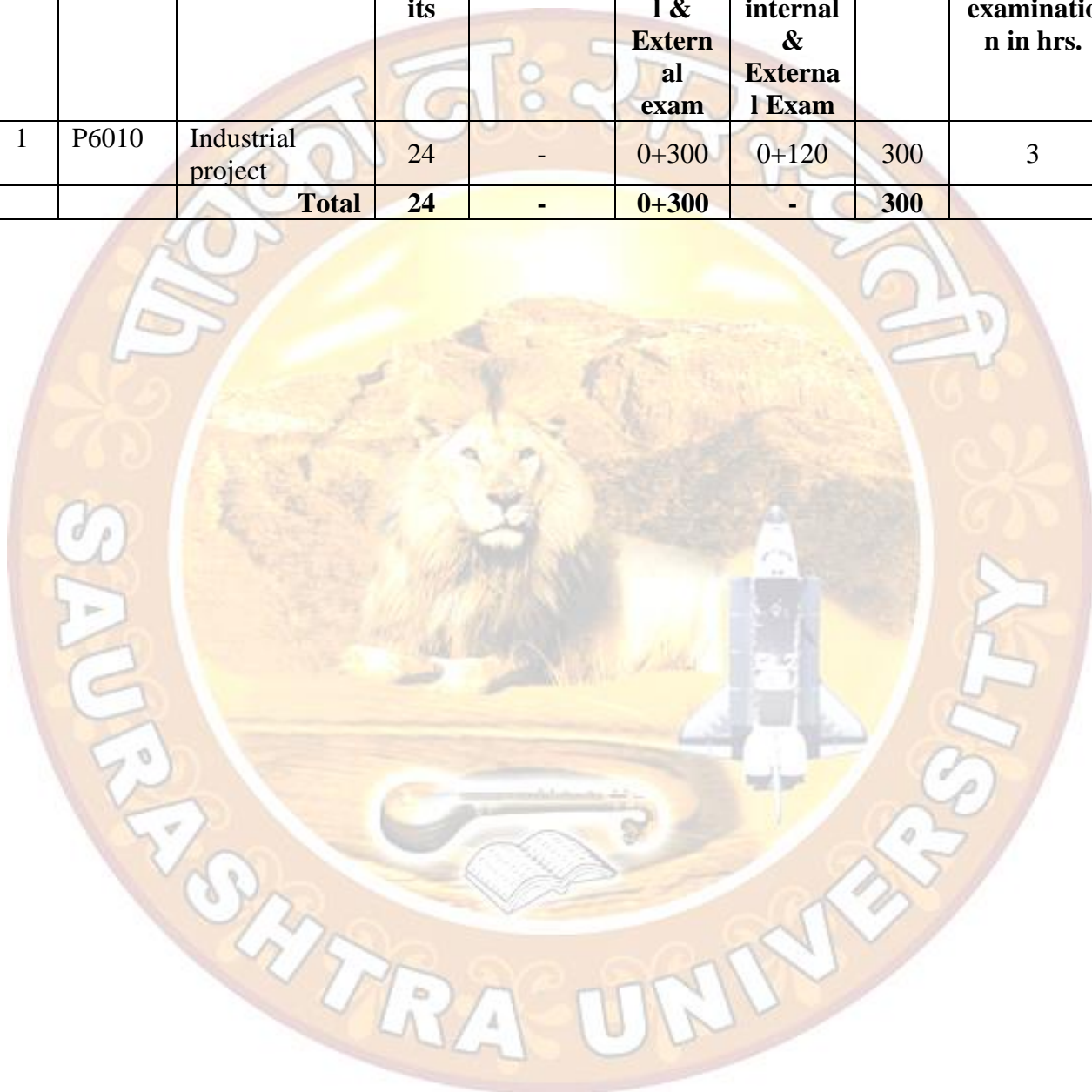# Master of Compute Application (MCA)
Semester – III

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal & External exam	Passing standard for internal & External Exam	Total marks	Duration of semester end examination in hrs.
1	P3010	Core java	4	4	30+70	12+28	100	02:30
2	P3020	Software Engineering	4	4	30+70	12+28	100	02:30
3	P3030	Web programming – 1	4	4	30+70	12+28	100	02:30
4	P3040	Cloud computing	4	4	30+70	12+28	100	02:30
5	P3050	Operation research	4	4	30+70	12+28	100	02:30
6	P3060	Practical – 3 (P3010, P3030, P3050)	4	10	100	40	100	3
		Total	**24**	**30**	**150+450**	**-**	**600**	

Master of Compute Application (MCA)
Semester – IV

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal & External exam	Passing standard for internal & External Exam	Total marks	Duration of semester end examination in hrs.
1	P4010	Advanced Java	4	4	30+70	12+28	100	02:30
2	P4020	.Net frame work and C#	4	4	30+70	12+28	100	02:30
3	P4030	Web programming – 2	4	4	30+70	12+28	100	02:30
4	P4040	Mobile computing	4	4	30+70	12+28	100	02:30
5		Elective – 1						
	E4051	Advanced networking						
	E4052	Cyber security	4	4	30+70	12+28	100	02:30
	E4053	GIS, GPS & Remote Sensing						
6	P4060	Practical – 4	4	10	100	40	100	3
		Total	**24**	**30**	**150+450**	**-**	**600**	

Master of Compute Application (MCA)
Semester – V

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal & External exam	Passing standard for internal & External Exam	Total marks	Duration of semester end examination in hrs.
1	P5010	Building application using ADO.NET & ASP.NET	4	4	30+70	12+28	100	02:30
2	P5020	Mobile programming language	4	4	30+70	12+28	100	02:30
3		Elective – 2						
	E5031	Data ware housing , data mining						
	E5032	Biometrics Technologies	4	4	30+70	12+28	100	02:30
	E5033	Image processing						
4	P5040	Project – 1	6	9	100	40	100	3
5	P5050	Practical – 5	6	9	100	40	100	3
		Total	**24**	**30**	**90+410**	**-**	**500**	

Master of Compute Application (MCA)
Semester – VI

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal & External exam	Passing standard for internal & External Exam	Total marks	Duration of semester end examination in hrs.
1	P6010	Industrial project	24	-	0+300	0+120	300	3
		Total	**24**	**-**	**0+300**	**-**	**300**	

	Master of Compute Application (MCA)	
	Semester - I	
	P1010 : Introduction to programming using C	

Course outcomes:
- The course gives the knowledge of fundamental of programming.
- Builds the logic of the students.

Unit	Detail syllabus	Marks
Unit-1	**Introduction to C Language**	**14**
	❖ 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 looping structures.	
Unit-2	**Manipulation of String**	**14**
	❖ 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 and union**	**14**
	❖ 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	
Unit-4	**User define function**	**14**
	❖ 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.	
Unit-5	**File handling**	**14**
	❖ File handling, Defining, opening & closing a file, file operations, high level I/O and low level I/O. Open, Close, Create, Process Unformatted Data Files. (Formatted Console I/O functions, Unformatted Console I/O functions, Modes Of Files, Use Of fopen(), fclose(), fgetc(), fputc(), fgets(), fprintf(), fscanf(),fread(),fwrite(), Command Line Arguments.	
	Basic Text & Reference Books	
(1)	Programming & Data Structure using C – By: Dr. Atul Gonsai, Saurashtra Uni. Publications	
(2)	Programming in C – by E. Balaguruswami (TMH)	
(3)	Computer programming in C – by V. Rajaraman (PHI)	
(4)	The C programming language – by Richi&Karninghan (PHI)	

|	
(5)	C/C++ programmer's guide – by Pappas & Murray (BPB)
(6)	The spirit of C – by Mulish kooper (Jaico)
(7)	Understanding pointers in C – by Y. Kanetkar (BPB)

Master of Compute Application (MCA)	
Semester – I	
P1020 : Computer Organization and Architecture	

Course outcome:
- It gives the idea of fundamental of computer organization.
- Give the awareness of the students about computer and its peripherals.

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	
	P1030 : Internet and Introduction to Web Technology	

Course outcomes:
- The course develops the students in developing of wab based applications.
- It gives the idea of internet, intranet and its applications.

Unit	Detail syllabus	Marks
Unit-1	**Web Fundamentals**	**14**
	❖ 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.	
Unit-2	**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-3	**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-4	**Introduction to Java Script**	**14**
	❖ Introduction to JavaScript, Writing JavaScript into HTML, Data Types and Literal, Type Casting, Creating Variable, Incorporing 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-5	**Built in Objects in JavaScript**	**14**
	❖ Events of JavaScript, 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, String Built in functions, Date Built in functions, Mathematical Built in functions.	
Basic Text & Reference Books		
(1)	HTML, Java Script, DHTML and PHP, BPB Publication, New Delhi by Ivan Bayross,	

15

(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.
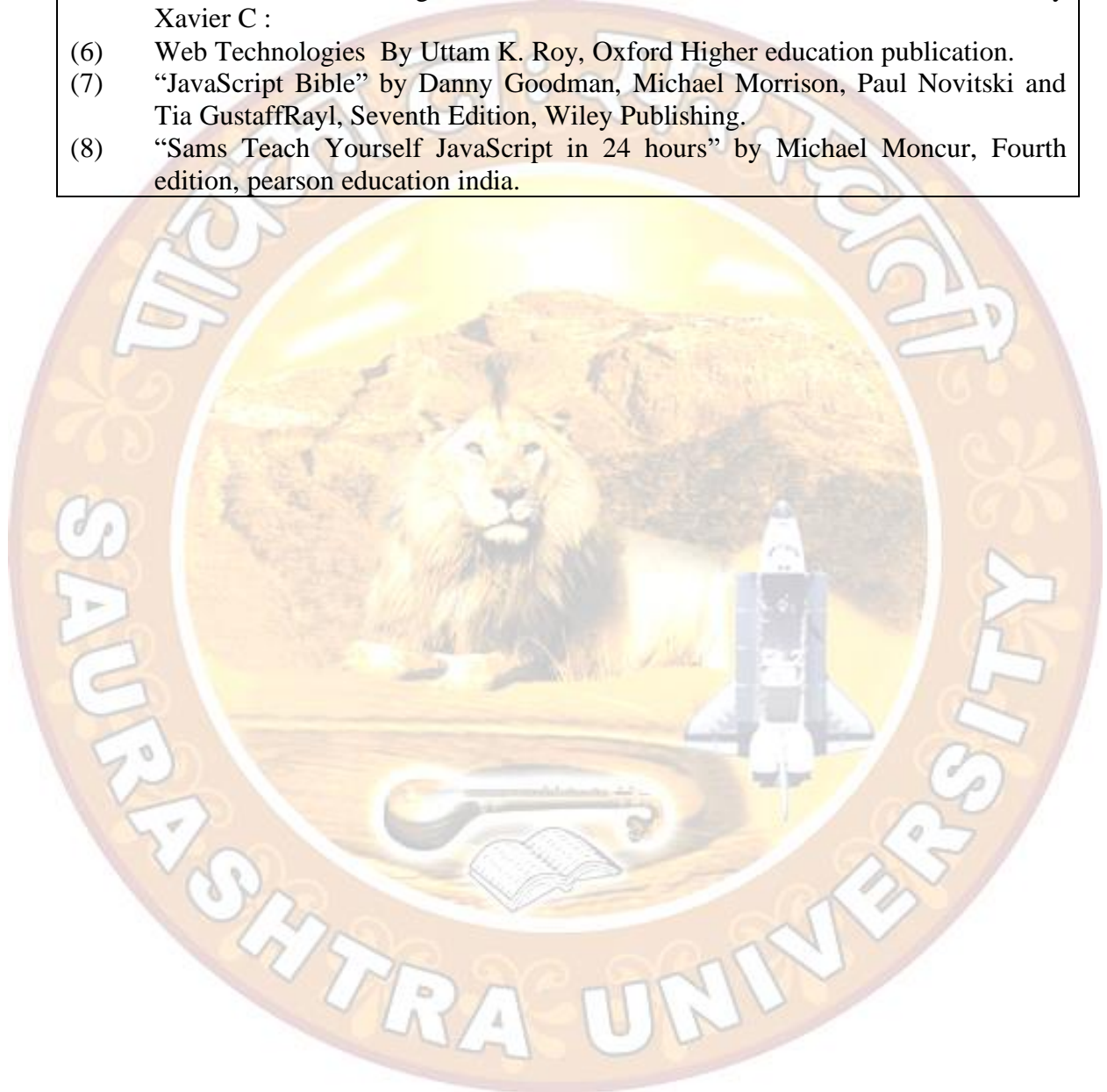
<table>
<tr><td colspan="3" align="center">Master of Compute Application (MCA)
Semester – I
P1040 : Database concepts and tools</td></tr>
<tr><td colspan="3">Course outcomes:

The course enriches the students from the database point of view
students are able to use any database software
They are able to write the queries and sub queries.
Abel to create the data strcture.
</td></tr>
<tr><td>Unit</td><td align="center">Detail syllabus</td><td>Marks</td></tr>
<tr><td>Unit-1</td><td>Concept of Database management system</td><td>14</td></tr>
<tr><td></td><td>
❖ 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.</td><td></td></tr>
<tr><td>Unit-2</td><td>Relational data model</td><td>14</td></tr>
<tr><td></td><td>
❖ 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</td><td></td></tr>
<tr><td>Unit-3</td><td>Introduction to ORACLE Server & SQL</td><td>14</td></tr>
<tr><td></td><td>
❖ 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</td><td></td></tr>
<tr><td>Unit-4</td><td>Introduction to PL/SQL</td><td>14</td></tr>
<tr><td></td><td>
❖ 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</td><td></td></tr>
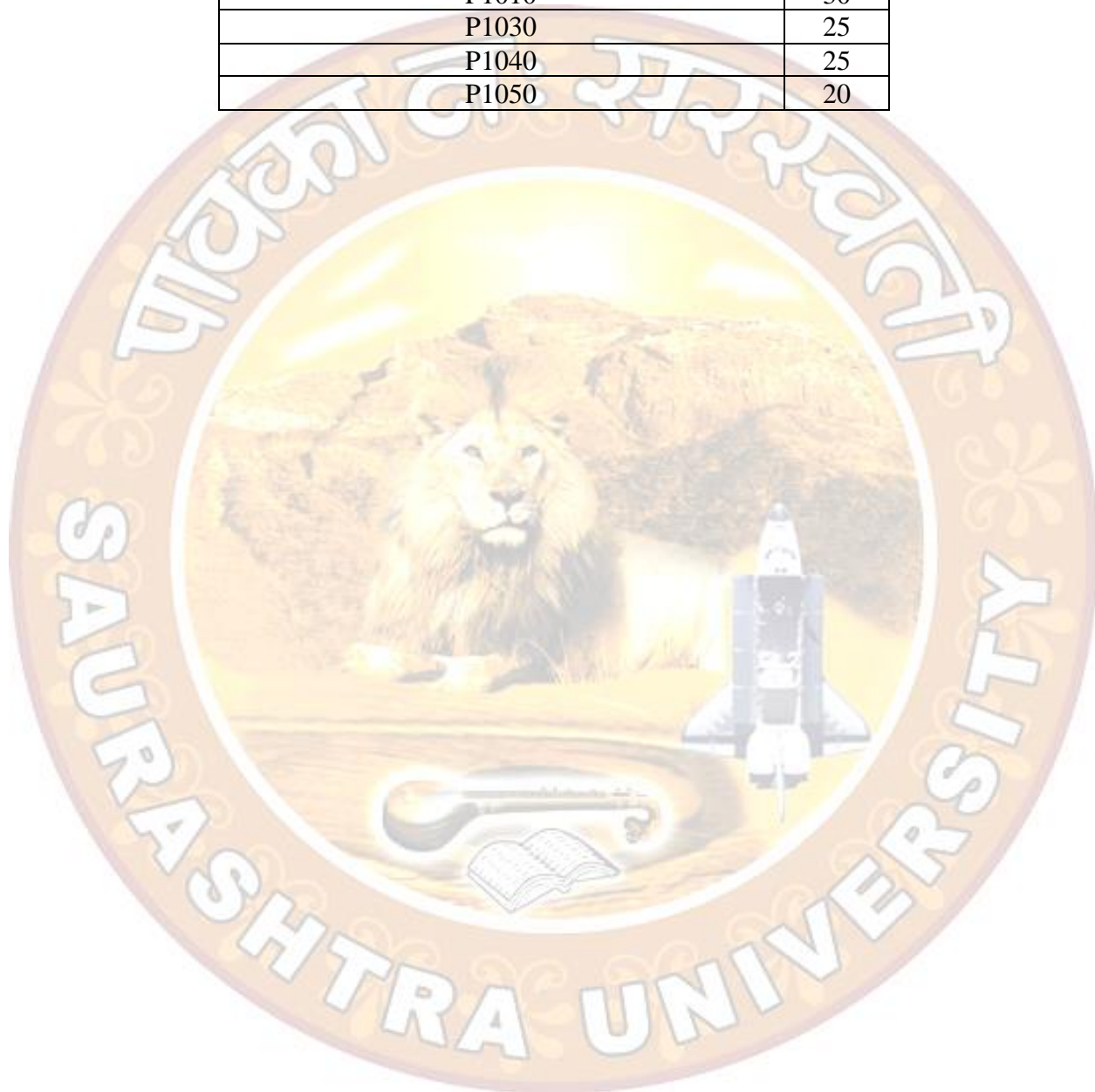<tr><td>Unit-5</td><td>ORACLE Database Object, Users , Privileges & Roles</td><td>14</td></tr>
</table>

	❖ 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)	SQL/PLSQL , The Programming Language of ORACLE , BPB Publication by Ivan Bayross
(2)	Database Systems using ORACLE , PHI Publication by Nilesh shah
(3)	Database System Concepts- Silberschatz, Korth, Sudarshan, Fifth Edition, McGraw Hill
(4)	Fundamentals of Database Systems, Elmsasri ,Navathe, Pearson Education, Fifth Edition (2008)
(5)	An Introduction to Database Systems, C.J.Date, a Kannan, S Swaminathan,
(6)	Pearson Education, Eighth Edition (2006) (Equivalent Reading)
(7)	Oracle PL/SQL Programming by Scoot Urban, Oracle Press
(8)	Database Systems: Concepts, Design and Applications, S. K. Singh. Pearson
(9)	Education
(10)	Database Management Systems, Ramakrishnan, Gehrke, McGraw Hill,Third
(11)	edition
(12)	Database Systems: Design, Implementation and Management, Peter Rob, Carlos
(13)	Coronel, Cengage Learning, seventh edition (2007)
(14)	Practice book on SQL and PL/SQL by Anjali, Amisha, Roopal and Nirav
(15)	publications.
(16)	Database management Systems, Leon and Leon, Vikas Publication

	Master of Compute Application (MCA) Semester - I P1050 : Computer oriented Numerical & statistical method	
Course outcomes: • The course focuses on mathematical concept from computer point of view and it develops the logic of the students.	
Unit	**Detail syllabus**	**Marks**
Unit-1	**Solution of non-linear & transcendental equations**	**14**
	❖ Bisection method, method of false position, newton-rapson method, secant method, method of successive approximation, concept oriented theoretical consideration of above methods. Implementation of all the methods using C language.	
Unit-2	**Solution of linear equations**	**14**
	❖ Meaning, conditions for solutions, solution of equation by direct methods - (Gaussian elimination, Gaussian jordan), iterative methods - (Jacobi method, gaussian seidel), ill-conditional equations and solution. Implementation of all the methods using C language.	
Unit-3	**Interpolation and approximation**	**14**
	❖ Introduction, finite differences, Newton's formulae, Central difference formulae, interpolation with unevenly spaced points, divided difference and their properties, inverse interpolation and double interpolation. Implementation of all the methods using C language.	
Unit-4	**Numerical integration & solution of ordinary differential equ.**	**14**
	❖ Concept of numerical integration with geometrical representation, trapezoidal method, simpson - 1/3 rule, simpson - 3/8 rule, veddle's rule. ❖ Understanding and solution of Ordinary Differential Equation and theoretical consideration, euler method, modified euler's method, R-K 2nd order & 4th order method, predictor corrector methods. Implementation of all the methods using C language.	
Unit-5	**Statistics**	**14**
	❖ Graphical representation, Frequency distributions, Measures of central tendency, Measures of dispersions, Correlation, Regression. Implementation of all the methods using C language.	
Basic Text & Reference Books	
(1)	Computer Oriented Numerical Method – by CK Kumbharana & Dr NN Jani	
(2)	Essential Computer Mathematics - by Seymour Lipschutz (Schaum series)	
(3)	Statistics (Schaum series)	
(4)	Fund. of mathematical statistics - by SC Gupta & VK Kapoor (S. Chand & sons)	
(5)	Statistics – by V.K.Kapoor.	
(6)	Mathematics – by V.K.Kapoor	

Master of Compute Application (MCA) Semester - I P1060 : Practical – 1 Based on (P1010, P1030, P1040, P1050)	
Detail syllabus	Marks
P1010	30
P1030	25
P1040	25
P1050	20

	Master of Compute Application (MCA) Semester - II P2010 : Object oriented programming using C++	

Master of Compute Application (MCA)
Semester - II
P2010 : Object oriented programming using C++

Course Outcome:
- It gives the concepts of OOP.
- Students are able to analyze any application from OOP view.

Unit	Detail syllabus	Marks
Unit-1	**Introduction to OOP Language C++**	**14**
	❖ C++ character set, tokens, structure of C++ programming, data types and it size, variables, constant, characters and character string, operators (arithmatic, relational, logical, bit-wise, compound assignment, increment-decrement, conditional, special operators), expressions, qualifiers, manipulator, type conversions, preprocessor directives, macro functions, operator precedence and associativity.	
	❖ For loop, while, do … while, and nesting of each others, if, if … else, else … if, nesting of if, switch, break, continue, go to.	
	❖ Single & multi dimensional arrays, strings, string manipulation, arrays of string, structure declaration, structure definition, nesting of structure, array of structure, structure & encapsulations.	
	❖ Function components, passing data to function, function return data type, library functions, parameter passing, return by reference, default arguments, inline function, function overloading, arrays & functions, C++ stack, scope and extent of variables, storage classes, functions with variable number of arguments, recursive function.	
Unit-2	**Object Oriented programming**	**14**
	❖ Procedural languages Vs Object Oriented approach, characteristics of OOL, classes and objects (i.e.), object initialization and cleanup (i.e.), friend function, static function, assignment and copy initialization, the this pointer, dynamic objects, inheritance & polymorphism.	
Unit-3	**Operating overloading & data conversion**	**14**
	❖ Over-loadable operators, unary operator overloading, binary operator overloading, overloading of new and delete operators, subscript operator overloading, assignment operator overloading, conversion between basic data type, conversion between object and basic data types, conversion between objects of different classes.	
Unit-4	**Inheritance and Stream handling**	**14**
	❖ Introduction to the inheritance, types of inheritance, constructor and destructor in inheritance. Application of inheritance.	
	❖ Definition of stream, predefined console stream, hierarchy of	

	console stream classes, unformatted I/O operations, formatted console I/O operations, custom/user defined manipulators, stream operators with use defined class, hierarchy of file stream classes, file modes, file pointers and their manipulations, sequential and random access to file, ASCII & binary file, saving & retriving of objects, in-memory buffers & data formatting.		
Unit-5	**Virtual function and templates**		**14**
	❖ Introduction, need of virtual function, pointer to derived class objects, array of pointers to base class objects, pure virtual function, concept of abstract class and dynamic binding. Function templates overloaded function templates, multiple arguments function template, class templates and its applications.		
	Basic Text & Reference Books		
(1)	Object Oriented Analysis and Design – By Booch G.		
(2)	Designing Object Oriented software – By Rebecca Wirfs – Brock (PHI)		
(3)	Object Oriented Modeling and Design – James Rumbaugh (PHI)		
(4)	Mastering C++ programming – By Venugopal, Rajkumar, Ravishankar (TMH)		
(5)	Mastering C+ - By Robert Lafore		
(6)	Borland C++ & OOPS – TED Fasion		
(7)	C++ Programming language – By Stroustrup		
(8)	Programming with ANSI C++ by Bhusan Trivedi; Oxford Press		

	Master of Compute Application (MCA) **Semester - II** **P2020 : Computer network**	
colspan="3"	**course outcomes:** • Gives the fundamental about the computer network. • They are able to know the types of network, cables and functionalities of the network and other network related equments.
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. Intranets and Internets Network Services, FileServices, File Transfer Services, Printing Services, Application Services, Wide area and local networks, 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 standard.	
Unit-3	**Transmission Media**	**14**
	❖ 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. Wireless Media, Reason for wireless Network, Wireless Communication with LANs, Comparison of Different Wireless Media, Time Division Multiplexing (TDM), Time Division Multiple Access (TDMA).	
Unit-4	**Connectivity Devices, Network Topologies and architectures**	**14**
	❖ Connectivity Devices: Introduction to Modems, Asynchronous Transmission, Synchronous Transmission, Network Adapter card, Repeaters Hubs Passive, Active, Intelligent, Bridges, Routers, Brouters, Gateways, Routing Algorithms, Distance Vector Routing, Link State Routing. ❖ 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	**Switching & Routing In Networks, TCP/IP**		**14**
	❖ Switching & Routing In Networks: Message Switching, Packet switching when and when not to use packet switching, packet routing, and packet switching support to circuit switching networks. ❖ TCP/IP: TCP/IP and internetworking, related protocols, ports and sockets, The IP address structure, IP datagram.		
Basic Text & Reference Books			
(1)	Networking essentials -By Joe casad, Dan newland (Tech media)		
(2)	Data and computer communication -By Stallings (Macamillan)		
(3)	Design & analysis of computer communication network -By V Ahuja (PHI)		
(4)	Black U "Computer network – protocol standards and interfaces", PHI		
(5)	Stallings, W "Computer communication network" 4th edition PHI		
(6)	Tannebaum A S " Computer networks", PHI		
(7)	B A forozon "Data communication and networking", TMH		
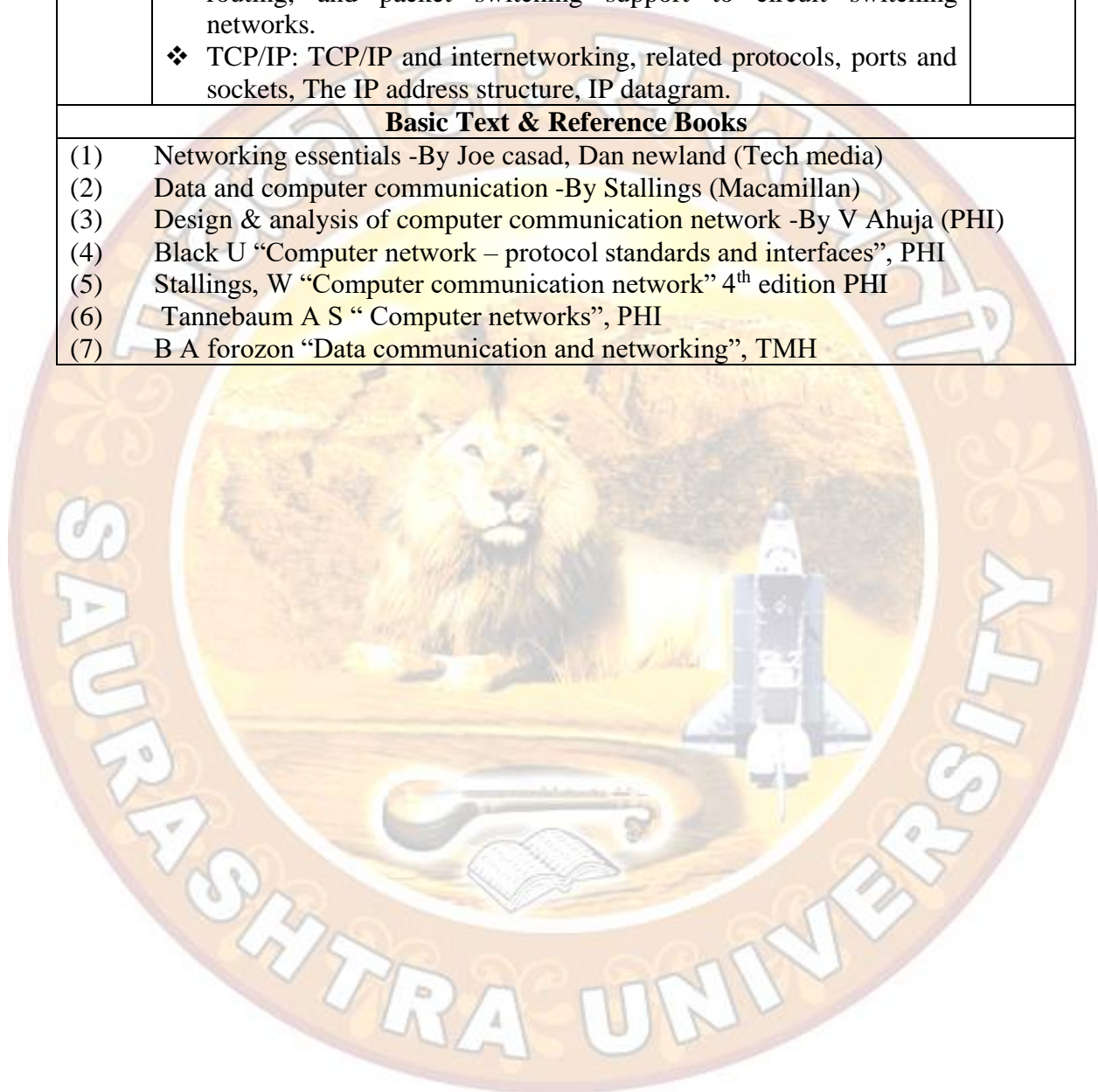
Master of Compute Application (MCA) Semester - II P2030 : System analysis and design	
Course outcomes: • The course focus on analysis and design of the computer system. • They are able to conver the real life problem into the computerized system.	

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 of Database, Top-Down structure of modules, Coupling & Cohesion, Span of control, Module size, Shared modules, Software Design tools - Structured flowcharts, HIPO, Warnier diagrams.	
Unit-5	**Testing and Implementation Methods**	14
	❖ Unit test, system test, peak load test, storage test, performance time test, recovery test, verification, validations and certifications ❖ System Implementation methods (Parallel, direct cut-over, Pilot approach, 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: Yourdon Press, New York.	

	Master of Compute Application (MCA) Semester - II P2040 : Operating system and Linux programming	
Course outcome:		
• Gives the idea of OS i.e. linux, windows etc.		
• It focus how the operating system work.		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction of OS and Process Management**	**14**
	❖ What is OS, General categories of OS – Desktop system, Multiprocessor systems, Distributed systems, clustered systems, Real time systems, Handheld systems. ❖ Process concepts - States of process, Scheduling, Threads – User & Kernel Threads, Single & Multi-Threaded, Processes, Multi-Threading Models, CPU scheduling - Scheduling Criteria, Scheduling Algorithms, System Deadlocks - Criteria for deadlock arise, Deadlock, prevention, Avoidance – Banker's Algorithm, Detection and recovery.	
Unit-2	**Memory and File Management**	**14**
	❖ Logical and physical address, Swapping, Contiguous Memory, Allocation, Paging, Segmentation, Segmentation with paging, Virtual memory – Demand Paging, Page replacement algorithms ❖ File Concept – Access Methods, Directory Structure, File System Structure, Allocation methods, Free space management, Directory implementation, Redirecting input and output, Concept of Piping	
Unit-3	**Introduction to Linux/Unix**	**14**
	❖ Log in, log out, basic shell commands, Files and directories, users and groups, Permissions. ❖ Moving around, Looking at the contents of directories, Creating new directories, Copying files, Moving files, Deleting files and directories, Looking at files, Getting online help. ❖ General purpose utilities : clear: Clear the Screen, script: Record your session, chmod: Changing file permission, chown and chgrp: changing file ownership, find: Search for files, head: Displaying Beginning of a File, tail: Displaying Ending of a File, wc: Word Count, touch: Updating a File's Time and Date, who: Login Details.	
Unit-4	**Process & file management in Linux/Unix**	**14**
	❖ ps: Process Status, Background and Foreground Processes, nice: Job Execution with Low Priority, kill: Premature Termination of Process, at: Execute on Specified Time, batch: Execute Later, cron: Running Jobs Periodically, crontab: Manipulate the crontab for a User, wait: Waiting for Process to Complete, sleep: Process to Sleep ❖ Finding Patterns, Regular Expressions, grep: Searching for Pattern, egrep: Extended grep, fgrep: Multiple String Searching, Working with Columns and Fields, cut: Splitting File Vertically,	

	pest: pasting File, join: Joining Data, Tools for Sorting, sort: Ordering Data, uniq: Locating Repeated Lines, Comparing files, cmp: Comparing Two Files, comm: Finding What is Common, diff: Converting One File to Other, Changing information in Files, tr: Translating Characters, sed: stream editor, Examining File contents, od: Displaying Data in Octal, mount: Mounting File System, umount: Unmounting File System	
Unit-5	**Inter-process communication and Shell programming**	**14**
	❖ write: Two Way Communication, talk: An Alternative Way to write, mail: The Universal Mailer, news: The Bulletin Board, finger: Details of Users, telnet: Remote Login ❖ VI editor command and Shell scripts, making shell scripts interactive, command line arguments, shells & sub-shells, shell functions, String handling, array .	
Basic Text & Reference Books		
(1)	Operating Systems Concepts. Addision – Wesley By Silberschetz A and Galvin	
(2)	Operating Systems Prantice Hall of India Pvt. Ltd. By Tanenbaum	
(3)	Operating Systems.McGraw Hill Book Co. By Madnick S. & Donovan J. J.	
(4)	UNIX-LINUX Concept Shell Scripts and Administration By: Dr. Atul M Gonsai, Saurashtra University Publications	
(5)	UnixOperating system By Ritchie BPB publications	
(6)	UNIX concepts & application By Sumitabha Das TMH publication	
(7)	Adcanced UNIX – A programmer's guide (Stephen piata SAMs)	
(8)	Silberschetz A and Galvin : Operating Systems Concepts. Addision - Wesley.	
(9)	Tanenbaum : Operating Systems Prantice Hall of India Pvt. Ltd.	
(10)	Madnick S. & Donovan J. J. : Operating Systems.McGraw Hill Book Co.	

	Master of Compute Application (MCA)	
	Semester - II	
	P2050 : Data structure and algorithm	
Course outcome: • It gives the inner mechanism of the computer functionality • Students are focused on liner and no linear data structure • It gives the idea of data structure, file structure etc. The course is design to develop the students from the fundamental
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, Trie Structures, Hash table, Search Methods, Introduction, Hashing Functions, Collision Resolution Techniques.	
Unit-5	**Greedy Methods**	**14**
	❖ General method. ❖ Knapsack Problem. ❖ Job sequencing with deadlines. ❖ Spanning trees.	
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 - II P2060 : Practical – 2 Based on (P2010, P2040, P2050)	
Detail syllabus	Marks
P2010	50
P2040	25
P2050	25

	Master of Compute Application (MCA) **Semester - III** **P3010 : Core Java**	
colspan="3"	**course outcomes:** • Course focus on concepts of OOP and development of web based applications. • It also focus on java fundamentals
Unit	**Detail syllabus**	**Marks**
Unit-1	**Basics of classes, objects and method in Java**	**14**
	❖ Java Environment, Java Features and support, Sample program & Compilation, Using block of code, Lexical Issues (White space, identifiers, Literals, Comments, Separators, Keyword), Java Class Library, Data type, Operators, Control structures, Arrays and String 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, Final variables and methods, final classes, Method Using final to Prevent Overriding & overloading, finalize methods ,The Object Class, Visibility control – public access, friendly access, protected access, 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, Access protection, 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 class and 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	Graphics and I/O files in java	14
	❖ Layout managers (FlowLayout, BorderLayout, CardLayout, GridBagLayout, GridLayout), AWT controls (Labels, buttons, canvases, checkboxes, checkboxgroup, choices, textfields, textareas, lists, scrollbars, panels, windows, frames, menus, menubars) ❖ Concept of streams, Difference between CharacterStreams and ByteStreams, CharacterStreams (Reader, Writer, BufferedReader, InputStreamReader, FileReader, BufferedWriter, OutputStreamReader, FileWriter, PrintWriter), ByteStreams (InputStream, FileInputStream, FilterInputStream, BufferedInputStream, DataInputStream, OutputStream, FileOutputStream, FilterOutputStream, BufferedOutputStream, DataOutputStream, PrintStream), Other Classes (RandomAccessFile, StreamTokenizer, File)	
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 - III** **P3020 : Software Engineering**	
colspan	course outcomes: • The course is designed to analyze the system. • The students is able to analyze ral life system to be implemented.	
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 Engineering Process, Eliciting Requirements, Elaborating Requirements, Negotiating Requirements, Validating Requirements.	
Unit-3	**Analysis Model**	**14**
	❖ Requirements Analysis, Elements of Analysis Model, Data Modeling 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 - III** **P3030 : Web programming - 1**	
colspan	**course outcomes:** • They can develop the real life system for the user • focus on development of web programming.	
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**	**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	
Unit-3	**Regular expression, session & cookies**	**14**
	❖ 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. ❖ Session Control and /Cookies , Sessions, Configuring Sessions, Session ❖ Functions, Cookies, Authentication with Session Control.	
Unit-4	**File system**	**14**
	❖ 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-5	**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.	
		Basic Text & Reference Books	
(1)	Beginning JavaScript 2nd Edition – Wrox		
(2)	Beginning PHP5, Apache, Mysql Web Development – Wrox		
(3)	PHP Bible, 2nd Edition :Tim Converse, Joyce Park		
(4)	PHP manual		
(5)	Beginning Ajax – Wrox		
(6)	PHP Bible, 2nd Edition :Tim Converse, Joyce Park		
(7)	Beginning PHP5, Apache, Mysql Web Development – Wrox		
(8)	XML Bible – Wiley		
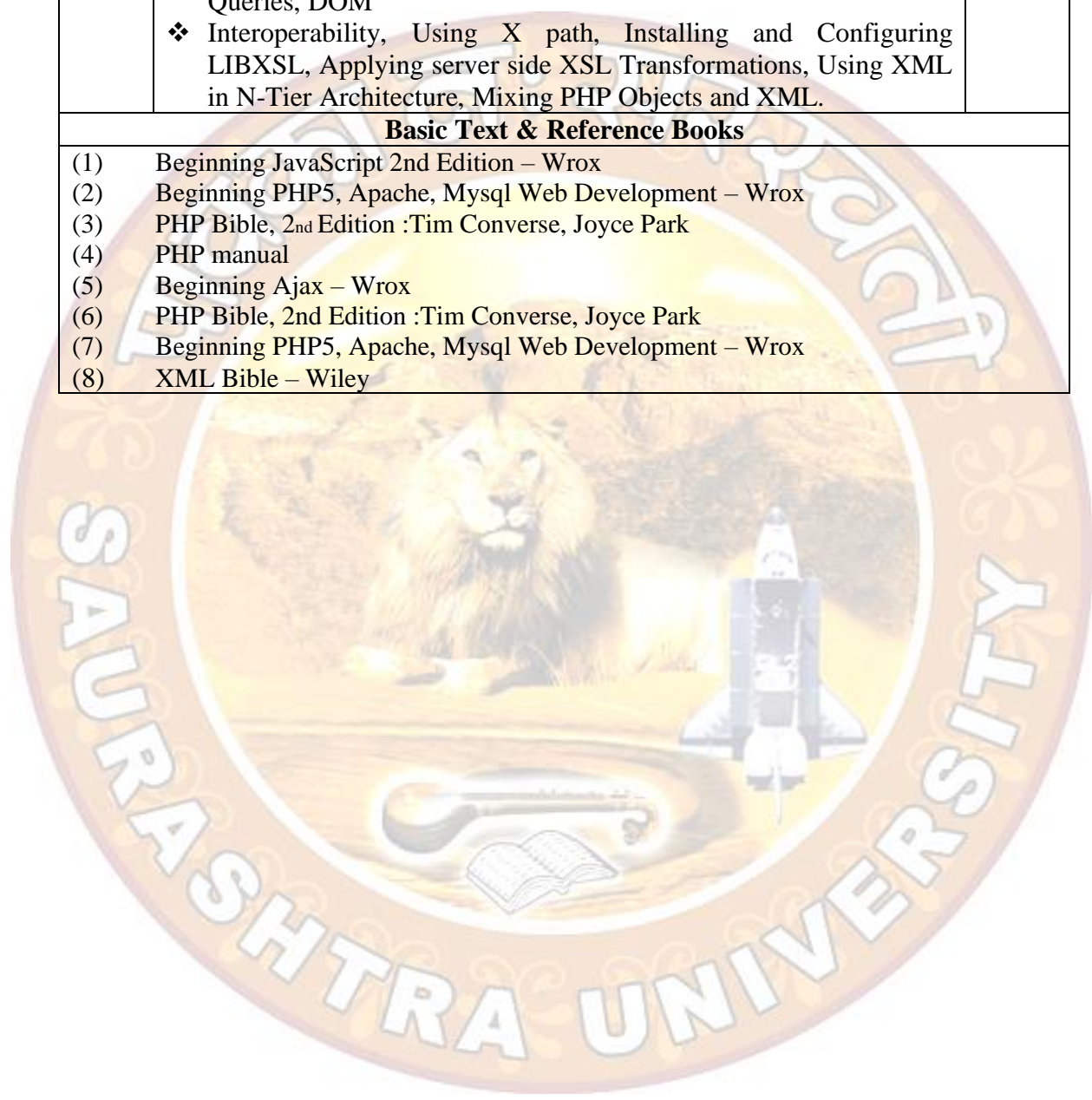
<table>
<tr><td colspan="3" align="center">

Master of Compute Application (MCA)
Semester - III
P3040 : Cloud computing

</td></tr>
<tr><td colspan="3">

course outcomes:
- Gives the fundamental idea of cloud and its utility.
- Students can identified, how the cloud is useful in real life.

</td></tr>
<tr><th>Unit</th><th>Detail syllabus</th><th>Marks</th></tr>
<tr><td>Unit-1</td><td>**Introduction to cloud computing**</td><td>14</td></tr>
<tr><td></td><td>

❖ Cloud and other similar configuration, cloud computing versus peer to peer architecture, cloud computing versus client server architecture, cloud computing versus grid computing, server virtualization versus cloud computing, cloud computing in a nutshell, system models for distributed and cloud computing, roots of cloud computing, layers and types of clouds, desired features of a cloud, basic principles of cloud computing, challenges and risks, service models.

❖ Cloud types and models – private cloud, components of private cloud, implementation phase of a private cloud, pro and cons of private cloud, public cloud and hybrid cloud.

</td><td></td></tr>
<tr><td>Unit-2</td><td>**Cloud computing services**</td><td>14</td></tr>
<tr><td></td><td>

❖ Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service(SaaS), Database as a Service (DaaS), Security as a Service, Specialized cloud services

</td><td></td></tr>
<tr><td>Unit-3</td><td>**Appli. architecture for cloud and Cloud deployment techniques**</td><td>14</td></tr>
<tr><td></td><td>

❖ Cloud application requirement, architecture for traditional versus cloud application, assumption for traditional and cloud applications, recommendations & fundamental requirement for cloud application architecture, SOA for cloud applications, parallelization within cloud applications.

❖ Factors for a successful cloud implementation, cloud network topologies, automation for cloud deployment, self service feature in a cloud deployment, federated cloud deployment, cloud performance- monitoring and tuning, impact of memory on cloud performance, improving cloud database performance, cloud services brokerage

</td><td></td></tr>
<tr><td>Unit-4</td><td>**Risks, consequences and costs of cloud computing**</td><td>14</td></tr>
<tr><td></td><td>

❖ Risk in cloud computing, risk assessment and management, risk of vendor lock-in, loss of control, risk of resource scarcity / poor provisioning, risk in multi tenant environment, risk of failure risk of malware and internet attacks, risk of management of cloud resource risk of network outages, risk of physical infrastructure legal risk, risk with software and application licensing, TCO for cloud computing, direct and indirect cloud cost, cost allocations in a cloud, chargeback models for allocation of direct and indirect cost, chargeback methodology, billable items, maintaining strategic flexibility in a cloud.

</td><td></td></tr>
</table>

Unit-5	Security in cloud	14
	❖ Data security in the cloud - data redundancy, data recovery, data backup data replication, data residency or location, data reliability, data fragmentation, data integration, data transformation, data migration, data confidentiality & encryption, key protection, data availability, data integrity, cloud data management interface, cloud storage gateways and its advantages, cloud firewall, virtual firewall. ❖ Application security in the cloud – Cloud application software lifecycle, application security in an IaaS, PaaS and SaaS environment and its protection.	

Basic Text & Reference Books

(1) Cloud computing Black book – Kailash Jayaswal, Jagannath Kallakurchi, Donald J Houde, Dr. Deven Shah – dreamtech press.

(2) Cloud Computing Bible - Barrie Sosinsky – Wiley India Pvt Ltd (2011)

(3) Cloud Computing: A practical approach by Anthony T. Vetle – Tata McGraw Hill Education Private Limited (2009)

(4) Cloud Computing For Dummies-- Judith Hurwitz , Robin Bloor , Marcia Kaufman , Fern Halper - – Wiley India Pvt Ltd

(5) Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More (Student Edition) - Kris Jamsa- Published by - Jones & Bartlett Learning

(6) Rajkumar Buyya, Christian Vechhiola, S.Thamarai Selvi , "Mastering Cloud Computing ", McGraw Hill Education (India) Private Limited
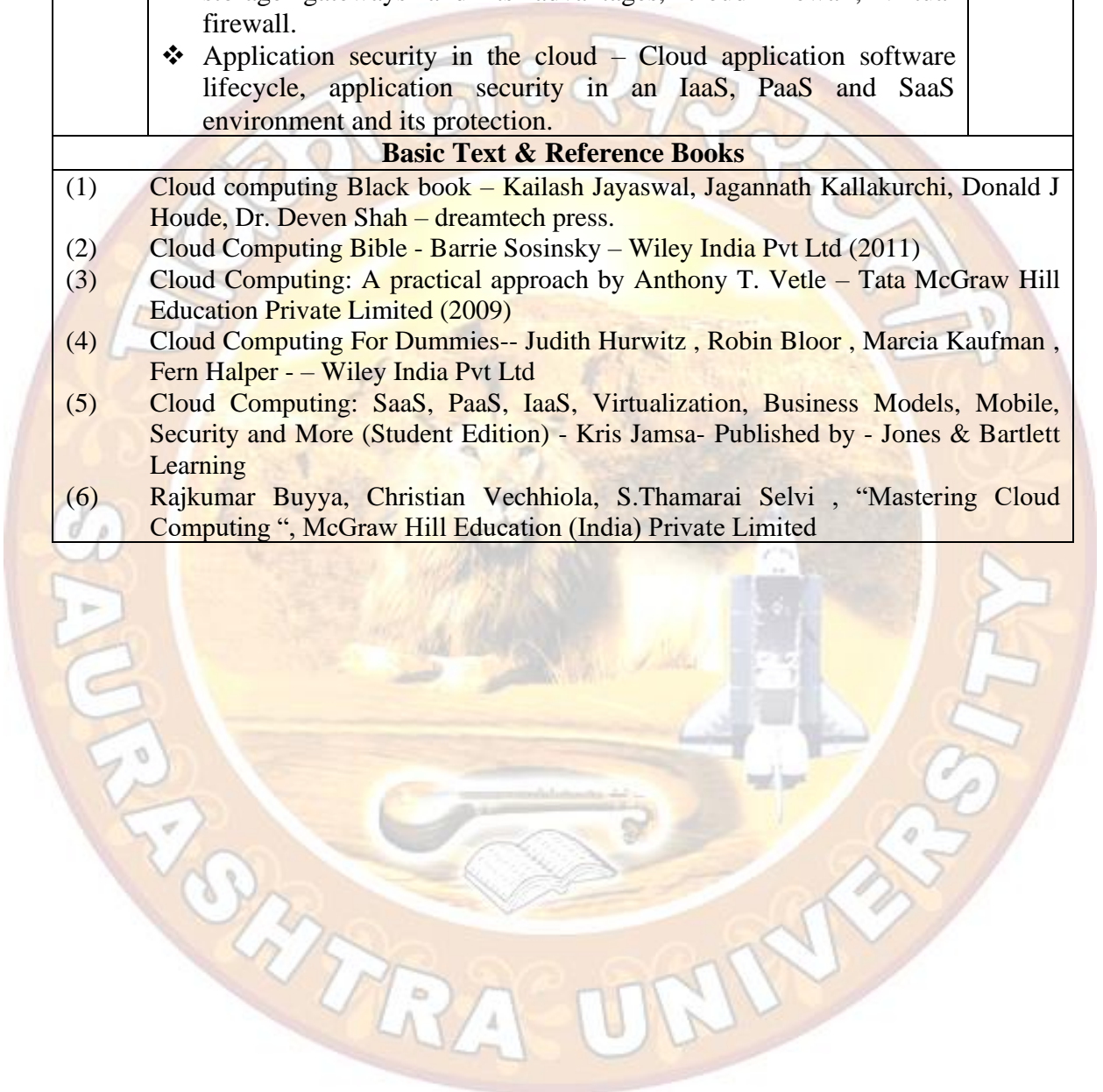
	Master of Compute Application (MCA)	
	Semester - III	
	P3050 : Operation Research	
colspan="3"	**course outcomes:**
colspan="3"	• The course focuses on mathematical concept from computer point of view and it develops the logic of the students.
Unit	**Detail syllabus**	**Marks**
Unit-1	**Linear programming**	**14**
	❖ Mathematical model, assumptions of linear programming, graphical solution, principles of simplex method, revised simplex method, duality, dual simplex method. ❖ Implementation of all the methods using C/C++/Java language	
Unit-2	**Sensitivity analysis in linear programming**	**14**
	❖ **Introduction** ❖ Change in objective function coefficient ❖ Change in the availability of resources ❖ Change in the input-out coefficents ❖ Addition of a new variable (Column) ❖ Addition of a new constraint (Row)	
Unit-3	**Transportation problem**	**14**
	❖ Problem Definition, LPP Formulation of TP ❖ Methods to find basic solution – North West Corner Method, Least Cost Method, Vogel's Method ❖ Test of Optimality – Stepping Stone Method, Modi Method ❖ Special Cases in TP ❖ Implementation of all the methods using C/C++/Java langSuage	
Unit-4	**Assignment problem**	**14**
	❖ Problem Definition, LPP Formulation of AP ❖ Methods to find solution – Hungarian Method ❖ Special Cases in AP ❖ Implementation of all the methods using C/C++/Java language	
Unit-5	**Project scheduling by PERT/CPM**	**14**
	❖ Introduction, basic difference between PERT/CPM, diagram representation, critical path calculation, construction of time chart and resources leveling, probability and cost consideration in project scheduling, project control. ❖ Implementation of all the methods using C/C++/Java language	
Basic Text & Reference Books
(1)   OR – Problems & Solutions, Sultan Chand & Sons, New Delhi by V.K.Kapoor
(2)   OR – Theory & Applications, MacMillan India Ltd, by J.K.Sharma
(3)   Operations Research - An Introduction, PHI by H.A.Taha

Master of Compute Application (MCA) Semester - III P3060 : Practical – 3 Based on (P3010, P3030, P3050)	
Detail syllabus	**Marks**
P3010	40
P3030	40
P3050	20

Master of Compute Application (MCA) **Semester - IV** **P4010 : Advance Java**		
Course outcomes:		
• focus on database, network programming etc. • Student are able to develop real life programs and able to implement.		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Java Swings**	**14**
	❖ Fundamental of Swing & Key features of Swing, Components & Containers, Swing Packages & Applications, Painting Fundamentals, Event Handling. Working with JFrame, Japplet, Jpanel, JtextField, JpasswordField, Jbutton, JcheckBox, JradioButton, Jlist, JscrollPane, JcomboBox, Jmenu, JmenuBar, JmenuItem, JpopupMenu, Jtree, Jtable.	
Unit-2	**JDBC (Java Database Connectivity)**	**14**
	❖ Introduction of JDBC, JDBC Architecture, Data types in JDBC, Processing Queries, Database Exception Handling, Discuss types of drivers.	
Unit-3	**Java Network Programming**	**14**
	❖ Networking Basis – TCP/IP models, Network Addressing, Domain Name Services(DNS), Ports, Sockets, Simple Client Server Program using TCP, Simple Client Server Program using UDP, Introduction to RMI Architecture, Object Serialization, Implementing Remote class & Interfaces, Client Server Program using RMI	
Unit-4	**Servlets**	**14**
	❖ Introduction of Servlet, HTTP Servlet Basics, Type of Servlet and Life cycle, Retrieving Information into Servlet , Making session and cookies into Servlet , Servlet with JDBC, Methods (getWriter(), getInitParametor(), getInitParametorNames(), getServletContext(), getServletName(), getServletInfo(), limit(), forward(), service, getAttribute(), getAttributeNames()	
Unit-5	**JSP**	**14**
	❖ Introduction JSP and JSP Basics, Directives (page, include, taglib), Scripting Elements (Declaration, scriptlots, expressing), Standard Action (JSP: useBean, JSP:getProperty, JSP:setProperty, JSP:param, JSP:include, JSP:Forward, JSP:plugin), Life cycle of JSP, JSP and Java Beans, JSP:session & cookies, Error Handling with JSP, JDBC with JSP	
Basic Text & Reference Books		
(1)	The Complete Reference Java 2 – Herbert Schildt and Patrick Naughton	
(2)	Teach your self Java – E. Balaguruswamy	
(3)	JAVA Servlet Programming – Oreilly	
(4)	Developing Java Servlets – Techmedia	
(5)	Professional JSP – Wrox	
(6)	JSP Beginner's Guide – Tata McGrawHill by Gary Bolling, Bharathi Nataragan	

course outcomes:
- Focus on web based programming
- Course focus on the business logic.

Unit	Detail syllabus	Marks
Unit-1	**.NET architecture**	**14**
	❖ **Components of the .NET Architecture** 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.	
Unit-2	**.Net Programming with C#**	**14**
	❖ 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 , C# Properties – Using Properties- Get Accessor, Set Accessor	
Unit-3	**Delegates, exception, interface and generics**	**14**
	❖ Delegates in C# - Single Cast, Multicast Delegates. Exception Handling in C# -Using the try Block, Using the catch Block, Using the finally Block, Using the throw Statement. Inheritance, Interfaces in C#, Structures in C#, Operator Overloading in C#, Using Generics in C#.	
Unit-4	**Threading and file handling**	**14**
	❖ Multithreading -Getting started with threads, managing thread lifetimes, destroying threads, scheduling threads, communicating data to a thread. ❖ File I/O with streams - Stream classes filestream, streamreader and streamwriter, string readers and writers file system classes directory and directoryinfo, file and fileinfo, parsing paths	
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 pickerprogress bar, timer. Status strip, user defined controls), Containers (Groupbox, panel, split container, tab control, tab layout panel, flow layout panel),Menu and Tools Bars, Menu strip, context menu strip, status strip, tool	

42

	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 - IV** **P4030 : Web programming – 2**	
colspan="3"	**course outcomes:** • Focus on web based programming • Able to build real life web based application and can implement.
Unit	**Detail syllabus**	**Marks**
Unit-1	**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.	
Unit-2	**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 and AJAX (AJAX Function), jQuery UI (Implementing Datepicker, Implementing Slider, Implementing Tabs)	
Unit-3	**Wordpress**	**14**
	❖ Foundations Of A Wordpress-Based Website (Understanding and Using domain names, WordPress Hosting Options, Installing WordPress on a Dedicated Server, Understanding Directory 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-4	**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 of plugin, Interaction with Database, Insertation of data)	

44

	❖ Wordpress Content Management (Understanding Posts Versus Pages,	
	❖ Organizing Posts with Categories, Connecting Posts Together with Tags, Custom Post Types, Managing Lists of Links)	
Unit-5	**Introduction to Laravel**	**14**
	❖ Need for framework, Main features of larvael, Structure of laravel 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, Handling restriction and returning views), Preparing the database, Mastering Blade, Back to the routes.	
Basic Text & Reference Books	
(1)	Web Services Essentials by Ethan cerami published by o'Reilly.	
(2)	Pro Jquery by adam freeman published by Apress	
(3)	Learning from jquery published by O'Reilly	
(4)	Professional wordpress design and development by Brad Williams, David Damstra, Hal Stern Published by wrox	
(5)	Laravel 5 Essentials by Martin Bean	
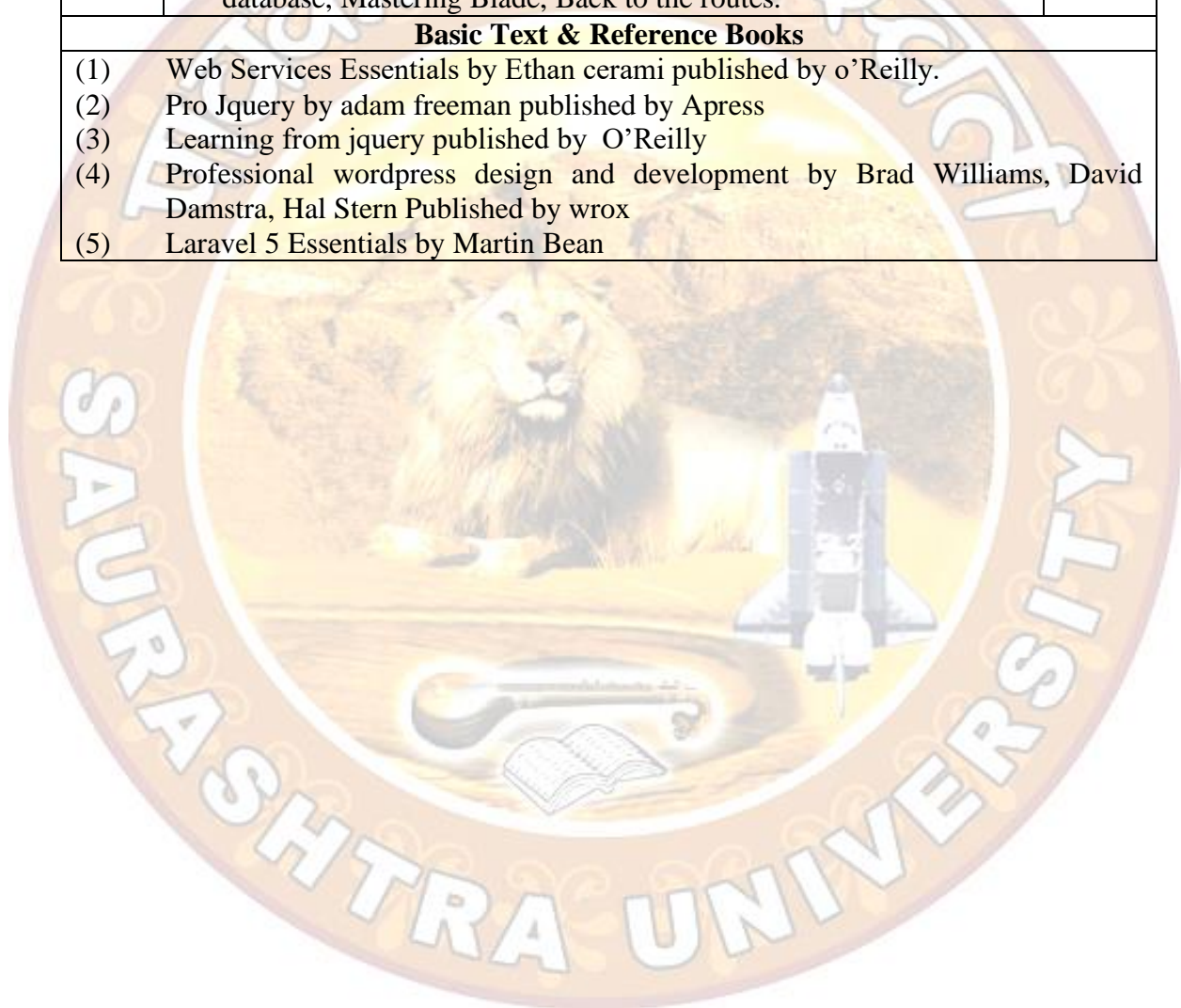
Master of Compute Application (MCA) Semester - IV P4040 : Mobile computing		
Course outcomes: • Gives the idea about mobile technology • fundamentals of mobile computing and message services.		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction to wireless networks and mobile computing**	**14**
	❖ Frequencies, signals, antennas, signal propagation, Multiplexing (SDM, FDM, TDM, COM), modulation(ASK, FSK, PSK), spread spectrum, cellular system ❖ Hidden/exposed terminals, near/far terminals, SDMA, FDMA, TDMA, CDMA	
Unit-2	**Mobile IP**	**14**
	❖ Infra red vs. radio transmission, infrastructure vs. ad-hoc networks, IEEE 802.11 architecture, MAC layer, Synchronization, power management, roaming, IEEE 802.11 802.11b, 802.11a, new developments, Bluetooth overview ❖ Overview, network elements, packet delivery, agent discovery, registration unneling and encapsulation, optimization, IPV6, IP micro-mobility support, DHCP and mobile IP	
Unit-3	**Mobile Transport Layer**	**14**
	❖ Traditional TCP and implications on mobility, indirect TCP, snooping TCP Discussion of project ideas Mobile TCP, fast retransmit/fast recovery, selective retransmission, and transaction oriented TCP TCP over 2.5/3G networks, performance-enhancing proxies	
Unit-4	**Mobile Computing & Messaging Services**	**14**
	❖ File systems and WWW architectures for mobile computing WAP - architecture, protocols (WDP, WTLS, WTP, WSP) WAP - Wireless Applications Environment, WML, Push architecture, push/pull services, push-pull based data acquisition, WAP1.X stacks, l-mode, WAP 2.0, ❖ Short Message Services (SMS) Multimedia Message Services(MMS) Multimedia transmission over wireless	
Unit-5	**Wireless Telecomm Networks**	**14**
	❖ Evolution of wireless telecomm networks : GSM, GPRS IS-95, CDMA-2000, W-CDMA, 3G	
Basic Text & Reference Books		
(1)	Mobile computing, Asoke K Talukder, Roopa R Yavagal	
(2)	Mobile communications, Jochen Schiller, Addison wesley	

	Master of Compute Application (MCA) Semester - IV E4051: Advanced Networking	
Course outcomes:		
• give the depth idea of the network and its related terms.		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Communication Protocols**	**14**
	❖ Peer – To – Peer Processes, network addressing (Physical Address, Internet Address, Port Address), Network Address Classification – Recognizing Classes, NETID & HOSTID, Classes & Blocks, Network Addresses	
Unit-2	**IP Classes, Sub-netting, Super-netting**	**14**
	❖ Special Addresses, Classes of IP address, Sub-netting, Super-netting, Classless Addressing, Process to Process Communication, TCP and UDP Port Addresses, Socket Addresses.	
Unit-3	**Socket Interface**	**14**
	❖ Socket Definitions, Address Transformation, Byte Manipulation Functions, Socket System Calls, Socket Addresses, Connectionless – Connection, Oriented C/S Interface.	
Unit-4	**Winsock Windows Programming**	**14**
	❖ Winsock Overview, Berkeley Sockets versus WinSock, WinSock Extensions to Berkeley Sockets, Windows Message-Driven Architecture, Retrieving the Network Service Protocol, Use Of Winsock Control.	
Unit-5	**Programming Applications**	**14**
	❖ Socket based chat program, Building an Internet Client Program, Building an Internet Server Program, Building Client Server Applications, Date and time Routines.	
Basic Text & Reference Books		
(1)	Unix network programming W. R. Stevens PHI	
(2)	TCP/IP protocol Suite Forouzan TMH	
(3)	Expert Guide to Visual Basic 6 Wayne S. Freeze BPB	
(4)	Network Programming in C	

	Master of Compute Application (MCA) Semester - IV E4052: Cyber Crime	
Course outcomes:		
• Focus on the cyber threats and its pro and cons.		
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 the Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining 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	

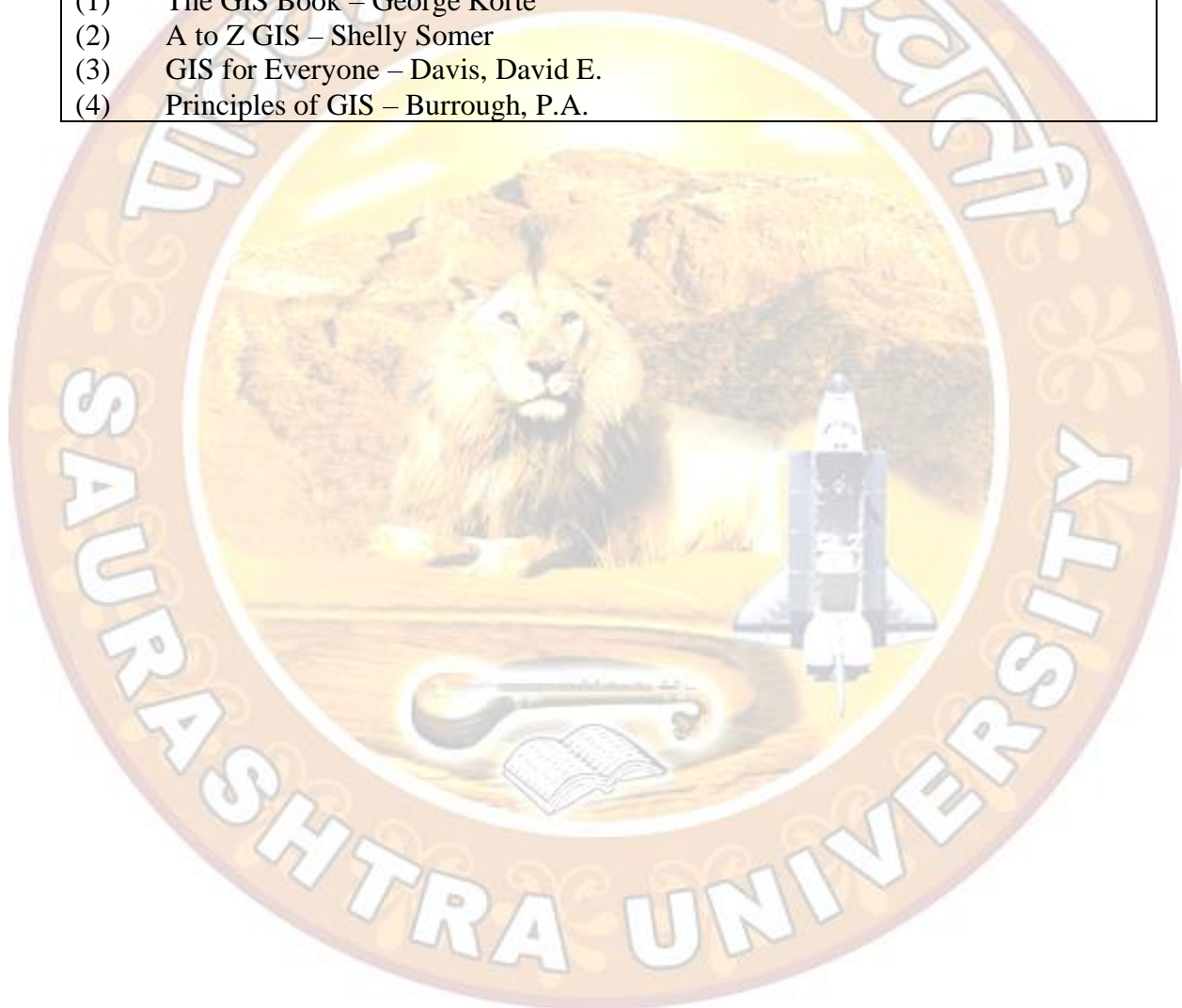|		Organizational Measures for Handling Mobile Devices-Related Security	
	❖	Issues: Encrypting Organizational Databases, Including Mobile Devices in Security Strategy, Organizational Security Policies and Measures in Mobile Computing Era: Importance of Security Policies relating to Mobile Computing Devices, 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 for SQL 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 café- 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 Computer Crime", O'Reilly Media, October, 2005
(2)		Chad Steel, "Windows Forensics: The field guide for conducting corporate computer investigations", Wiley India Publications, December, 2006 Chapter wise Coverage from the Text Book:

	Master of Compute Application (MCA) Semester – IV E4053: GIS, GPS & Remote Sensing	
Course outcomes:		
• Fundamentals of GIS, GPS and remote sensing.		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Geographic information system (GIS)**	**14**
	❖ Introduction, GIS – Perspective for insights and growth, Project domain of GIS, Real World Representation through GIS, Mapping Concepts, Features & Properties, Types of Information in a Digital Map, Map Analysis, Spatial Concepts, Vector and Raster format in GIS, Data Display and Querying, 3-D Analysis. ❖ Network Analysis(Environmental Resource Management, Emergency Planning and Routing, Provision of Health, Educational Or Retail Services, Facility Management for the Utilities, Highway Maintenance and Accident Monitoring, Market Analysis, Population Analysis and Prediction)	
Unit-2	**The global positioning system (GPS)**	**14**
	❖ Introduction, Need of GPS, How it works, Accuracy of GPS, The GPS satellite system, Components and Basic Facts of GPS, Components of a GPS(The Control Segment, The Space Segment, The User Segment), Surveying with GPS(Methods of Observations, Absolute Positioning, Relative Positioning, Differential GPS (The, Reference station, The Mobile station, Data link), Kinematics GPS.	
Unit-3	**Factors affects GPS**	**14**
	❖ GPS Receivers(Navigation Receivers, Surveying Receivers, Geodetic Receivers), Computation of coordinates in GPS (Transformation from Global to Local Datum, Geodetic Coordinates to Map Coordinates, GPS Heights and Mean Sea Level Heights) Factors that affects GPS (Reference Station in GPS, Real Use of GPS, GPS Applications, Future of GPS Technology, GPS in INDIA)	
Unit-4	**Fundamentals Remote Sensing**	**14**
	❖ Introduction to Remote Sensing, Electromagnetic Radiation, The Electromagnetic Spectrum, Interactions with the Atmosphere, Radiation – Target Interactions, Passive vs. Active Sensing, Characteristics of Images, Satellites & Sensors On the Ground, In the Air, In Space Satellite Characteristics: Orbits and Swaths Spatial Resolution, Pixel Size, and Scale, Spectral Resolution, Radiometric Resolution, Temporal Resolution, Cameras and Aerial Photograph, Multispectral Scanning, Thermal Imaging, Geometric Distortion in Imagery, Weather Satellites/Sensors, Land Observation, Satellites/Sensors, Marine Observation,	

		Satellites/Sensors, Other Sensors, Data Reception, Transmission, and Processing	
Unit-5	**Image interpretation & analysis and remote sensing applications**		**14**
	❖ Introduction, Elements of Visual Interpretation, Digital Image Processing, Pre-processing, Image Enhancement, Image Transformations, Image Classification and Analysis, Data Integration and Analysis, Remote Sensing Applications ❖ Remote Sensing Application (Introduction, Agriculture, Forestry, Geology, Hydrology, Sea Ice, Land Cover & Land Use, Mapping, Oceans & Coastal Monitoring)		
Basic Text & Reference Books			
(1)	The GIS Book – George Korte		
(2)	A to Z GIS – Shelly Somer		
(3)	GIS for Everyone – Davis, David E.		
(4)	Principles of GIS – Burrough, P.A.		

Master of Compute Application (MCA) Semester – IV P4060 : Practical – 4 Based on (P4010, P4020, P4030)	
Detail syllabus	Marks
P4010	35
P4020	35
P4030	30

<table>
<tr><td colspan="3">Master of Compute Application (MCA)
Semester – V
P5010 : Building application using ADO.NET & ASP.NET</td></tr>
</table>

Master of Compute Application (MCA)
Semester – V
P5010 : Building application using ADO.NET & ASP.NET

Course outcomes:

- focus on development of web based applications.

Unit	Detail syllabus	Marks
Unit-1	**Database Application Development with 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-2	**Introducing the ASP.NET Controls**	**14**
	❖ ASP.NET Pages, ASP.NET Framework, Web.config File, Global.asax PageStandard Controls important properties, methods and events- Displaying Information, Accepting User Input, Submitting Form Data, Displaying Images, Using the Panel Control, Using the HyperLink Control	
	❖ Validation Controls - Overview of the Validation Controls,RequiredFieldValidator Control, RangeValidator Control, CompareValidatorControl, RegularExpressionValidator Control, CustomValidator Control,ValidationSummary Control, Custom Validation Controls.	
Unit-3	**ASP Rich control**	**14**
	❖ Rich Controls important properties, methods and events - Accepting File Uploads, Displaying a Calendar, Displaying Advertisements, Displaying Different Page Views, Displaying a Wizard Designing ASP.NET Websites - Designing Websites with Master Pages(Creating Master Pages, Modifying Master Page Content), Designing Websites with Themes(Creating Themes, Adding Skins to Themes, Adding Cascading Style Sheets to Themes, Creating Global Themes, Applying Themes Dynamically)	
Unit-4	**Data base controls**	**14**
	❖ Overview of Data Access, Using the SqlDataSource Control, Using differentList Controls, Using the GridView Control, Using the DetailsView Control,Using the FormView Control, Using the Repeater Control, Using the DataList,DataGrid Control.	
Unit-5	**ASP Security controls**	**14**
	❖ Security Controls important properties, methods and events- Using the Login Control, Using the CreateUserWizard Control, Using theLoginStatus Control, Using the LoginName Control, Using theChangePassword Control, Using the PasswordRecovery Control, Using theLoginView Control.	
Basic Text & Reference Books		

(1)   ASP .Net Unleashed, Sams Publication
(2)   Mastering ASP.NET with C#, by A. Russell Jones SYBEX Publication
(3)   Professional ADO.NET
(4)   Microsoft .NET XML Web Services Step by Step by Adam Freeman

	Master of Compute Application (MCA) **Semester - V** **P5020 : Mobile programming language**	
colspan	**course outcomes:** • Gives the idea of android os and development mobile apps.	
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 orientation changes, Controlling the orientation of the activity, detecting orientation 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 using an 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-India Edition.

(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 Pvt Ltd (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 - V	
	E5031 : Data ware housing, data mining	
course outcomes:		
• Focus on huge data and its managment		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction of Data Warehouse**	**14**
	❖ Operational and Informational systems, OLTP and DSS systems, Characteristics of Data Warehouse, Data Warehouse software and hardware architecture, Basic steps to develop data warehouse architecture, Architectural components of data warehouse, Data warehouse system architecture (Two-Tiered and Three-Tiered)	
Unit-2	**Data Marts, Online Analytical Transactional Process, ETL**	**14**
	❖ Data Mart structure, Usage of Data Mart, Security in Data Mart, Data warehouse and Data Mart	
	❖ OLTP and OLAP systems, Types of OLAP (MOLAP, ROLAP and HOLAP) with advantages and Disadvantages	
	❖ Extraction of Data, Transformation of Data, Loading of Data, Practical study of popular ETL tools	
Unit-3	**Introduction of Data Mining**	**14**
	❖ Foundation of Data Mining, Data Mining Process (Data Understanding, Data Preparation, Creating database for data mining, Exploring database, preparation for creating for data mining model, building a data mining model, evaluating a data mining model, deployment of data mining model)	
Unit-4	**Data Mining Techniques**	**14**
	❖ Statistics (Point Estimation, Model based summarization, Bayes theorem, Hypothesis testing, Correlation and regression), Machine Learning, Decision Trees, Neural Networks, Genetic Algorithms (Cross-over techniques, Mutation Function, Fitness Function), Association Rules (Apriori Algorithm, Sampling Algorithm, Partitioning algorithm, Pincer-Search algorithm, FP-Tree Growth algorithm), Clustering (Hierarchical algorithm, Agglomerative algorithm, Divisive clustering, K- Means, Nearest Neighbor, clustering large database)	
Unit-5	**Practical study in WEKA Environment and implementation areas**	**14**
	❖ Implementation of data set into WEKA, Rules generated using charts, Analysis of data using WEKA, Comparison of various algorithms	
	❖ Insurance, Financial services, Healthcare and medicine, Telecommunications	
	❖ Transportation and logistics, Government, Education	
	Basic Text & Reference Books	
(1)	Data mining Explained, A manager's guide to customer centric business intelligence Rhonda Delmater Monte Hancock Digital Press	
(2)	Data mining, Pieter Adriaans Dolf Zantinge	

(3)   Data warehousing in the real world- A practical guide for business DSS Sam
       Anahory Dennis Murray

course outcomes:		
• Focus on biometrics tools and its utility		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction to Biometrics**	**14**
	❖ What is Biometrics? Why Biometrics? Authentication, Identification, Verification, Key Biometrics terms, System Model, Accuracy in Biometrics systems: FAR, FRR, FNMR, FMR, FTE, EER, ATV, Different Biometrics technologies, Comparison of Biometrics technologies	
Unit-2	**Fingerprint Identification Technology & Facial scan Technology**	**14**
	❖ History, Components, Working of Fingerprint technology, Deployment, Strengths, Weaknesses, Applications	
	❖ Facial scan: Components, Face detection, Working of Facial scan technology, Competing facial scan technology, Deployments, Strengths, Weaknesses, Face recognition technologies: Eigenfaces, LDA, ICA, LFA, EBGM, NN & SVM, Tensorfaces, Manifolds, Kernel methods, Applications	
Unit-3	**Iris scan, Retina Identification & Hand geometry Technology**	**14**
	❖ Components, Working, Deployments, Strengths, Weaknesses, Systems and performances, Application	
	❖ Retina/Choroids human descriptor, Technology, Eye signature, Instruments, Working, Performance, Limitations, Applications.	
	❖ History, Development, Applications, Working, Performance, Standardization ,Implementation and privacy issues	
Unit-4	**Voice & Other behavioral technologies Recognition**	**14**
	❖ Voice recognition Components, Working, Deployments, Strengths, Weaknesses, Performance issues, Applications.	
	❖ Signature scan recognition, Key stroke recognition, Palm print recognition, Gait recognition.	
Unit-5	**Multimodal and smart card technologies**	**14**
	❖ Introduction, Taxonomy, Levels of fusion, Performance comparison, Applications.	
	❖ What is smart-card? Smart-card chips, Temper resistance, Smart-card characteristics, Smartcard Reader, Current applications of Smart-card, Smart-card application development, Smart-card production steps, Smart-card platforms and operating systems, Smart-card security	
Basic Text & Reference Books		
(1)	Biometric Systems – James Wayman & Others – Springer	
(2)	Biometrics: Identity verification in a networked world – Samir Nanavati & Others – Wiley Computer Publishing	
(3)	Biometrics: Personal Identifixation in Networked Society – Anil Jain & Others – Kluwer Acedemic Publishers	

(4)	Handbook of Biometrics – Anil Jain & Others – Springer
(5)	Smart cards, Tokens, Security & Applications – Keith Mayes – Springer

Master of Compute Application (MCA) Semester - V E5033 : Image processing		
course outcomes: • Related to the image process.		
Unit	**Detail syllabus**	**Marks**
Unit-1	**Introduction to Digital Image Fundamentals**	**14**
	❖ What is Digital Image Processing, The origins of Digital Image Processing, Examples of Fields that use Digital Image Processing, Fundamental steps in Digital Image processing, Components of Image Processing system, Elements of Visual Perception, Light and Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships between Pixels, Linear and Nonlinear Operations	
Unit-2	**Image Enhancement**	**14**
	❖ Spatial domain – Background, Some basic gray level transformation, Histogram processing, Enhancement using Arithmetic/Logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters, Combining Spatial Enhancement features ❖ Frequency domain – Background, Introduction to the Fourier Transform and the Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering, Implementation	
Unit-3	**Image Restoration**	**14**
	❖ A model of the Image Degradation/Restoration process, Noise Models Restoration in the presence of noise only spatial filtering, Periodic noise reduction by Frequency domain filtering, Linear, Position-invariant degradation, Estimating the degradation functions, Inverse filtering, Minimum Mean Square Error (Wiener) filtering, Constrained least squares filtering, Geometric mean filter, Geometric Transformations	
Unit-4	**Color Image Processing**	**14**
	❖ Color Fundamentals, Color models, Pseudo Color image processing, Basics of full color image processing, Color transformations, Smoothing and sharpening, Color segmentation, Noise in color images, Color Image compression	
Unit-5	**Image Compression**	**14**
	❖ Fundamentals, Image Compression models, Elements of Information theory, Error free compression, Lossy compression	
Basic Text & Reference Books		
(1)	Digital Image Processing (Second Edition) By Rafael C. Gozales, Richard E. Woods. (Pearson Education)	
(2)	Digital Image Processing with MATLAB By Rafael C. Gozales, Richard E. Woods. (Pearson Education)	
(3)	Digital Image Processing By Kenneth R. Castleman. (Prenctice Hall)	

(4)   Digital Image Processing By Bernd Jähne (Springer)

Master of Compute Application (MCA)
Semester - V
P5040 : Project – 1

Detail syllabus	Marks
In house development of the project	100

Master of Compute Application (MCA)
Semester - V
P5050 : Practical – 5
Based on (P5010, P5020)

Detail syllabus	Marks
P5010	50
P5020	50

Master of Compute Application (MCA)
Semester - VI
P6010 : Industrial project

Detail syllabus	Marks
Project work to be done in industry	300