

**Kadi Sarva Vishwavidhyalaya**

**MCA Syllabus**

**Kadi Sarva Vishwa Vidhyalaya**  
**Regulations for the Degree of Master of Computer Application (M.C.A.)**

**R. PG. MCA 1 :**

Candidates for admission to the 3 - Year Master of Computer Applications (M.C.A.) course must have passed a Bachelor's degree examination either in science or commerce or management or social science or engineering (including technology) or equivalent, at the University examination of any recognized University with a minimum marks decided as per the directives of the qualifying entrance examination or GCET prescribed rules. Under Social Science all Arts graduates except those having graduated with languages as major subjects will be considered eligible for admission.

**R. PG. MCA 2 :**

The admission to the course will be given by merit obtained in a common admission test conducted by this University or appropriate authority.

**R. PG. MCA 3 :**

Examination for the M.C.A. course will be conducted under the Semester system. For this purpose, each academic year will be divided into two Semesters.

**R. PG. MCA 4 :**

A candidate who has 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 and the Migration certificate.

**R. PG. MCA 5 :**

No candidate will be admitted to any Semester examination for Master of Computer Applications unless it is certified by the Designated Authority which is the Head of the University Department or Principal of an affiliated college of the University :

- ( 1 ) That he has attended the course of study to the satisfaction of the designated authority.
- ( 2 ) That he has maintained a good conduct and character during the studies.

**R. PG. MCA 6 :**

Candidates desirous of appearing at any Semester examination of the M.C.A. course must forward their applications in the prescribed form, through the designated authority on or before the prescribed date.

**R. PG. MCA 7 :**

For any Semester the maximum marks for the internal and external assessments shall be shown in the teaching and examination scheme. For the purpose of internal assessment, sessional tests or any other suitable methods of assessment may be used by a department. The department will submit the internal as well as the midterm examination marks as per the notification of the University.

**R. PG. MCA 8 :**

A candidate will be promoted to the subsequent Semester according to the following scheme:

- (a) A candidate would be granted admission to the Second Semester irrespective of the result of First Semester.
- (b) A candidate would be granted admission to the Third Semester if and only if he/she has cleared all the subjects of First Semester and irrespective of the result of Second Semester.
- (c) A candidate would be granted admission to the Fourth Semester if and only if he/she has cleared all the subjects of Second Semester.

- (d) A candidate would be granted admission to the Fifth Semester if and only if he/she has cleared all the subjects of Third Semester.
- (e) A candidate would be granted admission to the Sixth Semester if and only if he/she has cleared all the subjects of Fourth Semester.
- (f) The final degree would be awarded to the student on successful completion of Semester VI.

**R. PG. MCA 9 :**

- Following criteria would be followed for awarding the mark statement of any Semester in MCA:
- (a) The mark statement with passing certificate for any Semester would be issued only if the student has cleared all the subjects in that Semester.
  - (b) The mark statement with cancelled certificate for any Semester would be issued if the student has not cleared one or more subjects in that Semester.
  - (c) In case a student is unable to clear all the subjects in any Semester, he/she would be reappearing for the same in the ATKT examinations. The mark statement with passing certificate will be issued only after all ATKTs' in that Semester are cleared. The ATKT marksheet would also have the marks of previously passed subjects carried forward in the marksheet.

**R. PG. MCA 10 :**

(a) To pass a subject in any Semester a candidate must obtain a minimum of 40% of marks under each head of the subject and minimum of 45% in the aggregate of that subject.

(b) If a candidate fails in only aggregate, but passes under each head, he/she has to appear for the end-term theory examination of that subject.

(c) If a candidate passes in aggregate, but fails in any other heads of a subject, he has to appear for that particular head to pass. (That is, for example if candidate passes in aggregate but fails in midterm exam of a subject, he has to reappear for midterm of that subject.)

(d) If a student fails in aggregate and also in any of other heads, he has to reappear for that particular head and pass in both. (That is, for example, if a candidate fails in aggregate and also fails in midterm exam of a subject, he has to reappear for the midterm examination of that subject and see that he/she passes in midterm as well as his/her aggregate should reach to 45%.)

**R. PG. MCA 11 :**

(a) For award of class at the end of Semester VI, the aggregate marks will consist of the sum of the following:

<b>YEAR</b>	<b>TOTAL Marks</b>	<b>Weightage</b>
<b>First Year Subjects</b> (First Semester + Second Semester)	1500	15%
<b>Second Year Subjects</b> (Third Semester + Fourth Semester)	1500	35%
<b>Third Year Subjects</b> (Fifth Semester + Sixth Semester)	2000	50%
<b>TOTAL</b>	5000	100%

(b) Using the aggregate marks calculated as per the above scheme a class will be awarded as follow:

- |                       |                                |
|-----------------------|--------------------------------|
| (1) 70% or more marks | - First Class with Distinction |
| (2) 60% or more marks | - First Class                  |
| (3) 50% or more marks | - Second Class                 |

**COURSE FOR THE THREE YEAR FULL-TIME MCA PROGRAMME**

**Academic Year-2007-2008**

<b>Trimester – I</b>	<b>Credit</b>	<b>Trimester – II</b>	<b>Credit</b>
<u>Fundamentals of Programming (T + P)</u>	3	<u>Operating System – I</u>	3
<u>Fundamentals of Computer Organization</u>	3	<u>Data and File Structures- I(T + P)</u>	3
<u>Database Management – I(T + P)</u>	3	<u>Object Oriented Concepts and Programming(T + P)</u>	3
<u>Discrete Mathematics</u>	3	<u>Database Management – II(T + P)</u>	3
<u>Internet Technologies(T + P)</u>	1.5	<u>System Analysis and Design</u>	3
Communication-I (Oral Communication)	1.5	Communication-II (Written Communication)	1.5
<b>Total</b>	<b>15</b>	<b>Total</b>	<b>16.5</b>

<b>Trimester – III</b>	<b>Credit</b>	<b>Trimester – IV</b>	<b>Credit</b>
<u>Operating System – II(T + P)</u>	3	<u>Client Server Architecture and Interface-I(T + P)</u>	3
<u>Data and File Structures – II(T + P)</u>	3	<u>Enterprise Resource Planning</u>	1.5
<u>Computer Oriented Numerical Method</u>	3	<u>Networking Technologies– I(T + P)</u>	3
<u>Database Management-III(T + P)</u>	3	<u>Computer Oriented Statistical Methods(T + P)</u>	3
Communication – III (Technical Communication)	1.5	<u>Management Information System</u>	1.5
<u>Mini Project - I</u>	3	<u>Software Engineering - I</u>	3
<b>Total</b>	<b>16.5</b>	<b>Total</b>	<b>15</b>

<b>Trimester – V</b>	<b>Credit</b>	<b>Trimester – VI</b>	<b>Credit</b>
<u>Client Server Architecture and Interface-II(T + P)</u>	3	<u>Computer Graphics(T + P)</u>	3
<u>Multimedia(T + P)</u>	1.5	<u>Operations Research</u>	3
<u>Java Programming(T + P)</u>	3	<u>Web Application tools-I(T + P)</u>	3
<u>Networking Technologies– II</u>	3	<u>Object Oriented Analysis and Design</u>	3
Human Resource Management	1.5	<u>Software Project Management</u>	3
<u>Software Engineering – II</u>	5	<u>Mini Project – II</u>	3
<b>Total</b>	<b>15</b>	<b>Total</b>	<b>18</b>

<b>Trimester-VII</b>	<b>Credit</b>	<b>Trimester-VIII</b>	<b>Credit</b>	<b>Trimester-IX</b>	<b>Credit</b>
<u>System Software(T + P)</u>	3	<u>Seminar on Contemporary Issues in IT</u>	3	<u>Industrial Project (3 Months)</u>	9
<u>Web Application tools -II(T + P)</u>	3				
<u>Data Warehousing and Data Mining</u>	1.5				
Elective-I (T + P) <u>Groupware Technology</u> <u>Advanced Java Programming</u>	3				
Elective-II <u>Grid Computing</u> <u>Mobile Computing</u> <u>Artificial Intelligence and Neural Network</u>	3				
<b>Total</b>	<b>13.5</b>	<b>Total</b>	<b>3</b>	<b>Total</b>	<b>9</b>

**SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - I (MCA) Applicable From June 2007 onwards

SR. NO.	SUBJECT NO.	SUBJECT NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME					PRACT	INTERNAL	TOTAL
			THEORY Hr.	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM M.	HR.	MARKS				
1.	MC-01	FUNDAMENTALS OF PROGRAMMING	3	-	2	30	1.5	40	2	50	30	150	
2.	MC-02	FUNDAMENTAL OF COMPUTER ORGANIZATION	3	1	-	30	1.5	40	2	-	30	100	
3.	MC-03	DATABASE MANAGEMENT-I	3	-	2	30	1.5	40	2	50	30	150	
4.	MC-04	DISCRETE MATHEMATICS	3	1	-	30	1.5	40	2	-	30	100	
5.	MC-05	INTERNET TECHNOLOGIES	3	-	2	-	-	30	2	10	10	50	
6.	MC-06	COMMUNICATION - I	3	-	-	-	-	30	1.5	-	20	50	
<b>TOTAL</b>			<b>18</b>	<b>2</b>	<b>6</b>	<b>120</b>	<b>-</b>	<b>220</b>	<b>-</b>	<b>125</b>	<b>160</b>	<b>600</b>	

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - II (MCA)

SR. NO.	SUBJECT NO.	SUBJECT NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME					PRACT	INTERNAL	TOTAL
			THEORY Hr.	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM M.	HR.	MARKS				
1.	MC-07	OPERATING SYSTEM – I	3	1	-	30	1.5	40	2	-	30	100	
2.	MC-08	DATA AND FILE STRUCTURES- I	3	-	2	30	1.5	40	2	50	30	150	
3.	MC-09	OBJECTS ORIENTED CONCEPTS AND PROGRAMMING	3	-	2	30	1.5	40	2	50	30	150	
4.	MC-10	DATABASE MANAGEMENT – II	3	-	2	30	1.5	40	2	50	30	150	
5.	MC-11	SYSTEM ANALYSIS AND DESIGN	3	1	-	30	1.5	40	2	-	30	100	
6.	MC-12	COMMUNICATION-II	3	-	-	-	-	30	1.5	-	20	50	
<b>TOTALS</b>			<b>18</b>	<b>2</b>	<b>6</b>	<b>150</b>	<b>-</b>	<b>230</b>	<b>-</b>	<b>150</b>	<b>170</b>	<b>700</b>	

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - III (MCA)

SR. NO.	SUBJECT NO.	NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME						
			THEORY Hr	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM M.	END TERM Hr.	PRACT MARKS	INTERNAL	TOTAL	
1.	MC-13	OPERATING SYSTEM – II	3	-	2	30	1.5	40	2	50	30	150
2.	MC-14	DATA AND FILE STRUCTURES – II	3	-	2	30	1.5	40	2	50	30	150
3.	MC-15	COMPUTER ORIENTED NUMERICAL METHOD	3	1	-	30	1.5	40	2	-	30	100
4.	MC-16	DATABASE MANAGEMENT-III	3	-	2	30	1.5	40	2	50	30	150
5.	MC-17	COMMUNICATION– III	3	-	-	-	-	30	1.5	-	20	50
6.	MC-18	MINI PROJECT – I	-	-	-	-	-	-	-	100	-	100
<b>TOTAL</b>			15	1	6	120	-	150	--	250	140	700

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - IV (MCA)

SR. NO.	SUBJECT NO.	NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME						
			THEORY Hr	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM M.	END TERM Hr.	PRACT MARKS	INTERNAL	TOTAL	
1	MC-19	CLIENT SERVER ARCHITECTURE AND INTERFACE-I	3	-	2	30	1.5	40	2	50	30	150
2.	MC-20	ENTERPRISE RESOURCE PLANNING	3	-	-	-	-	30	1.5	-	20	50
3.	MC-21	NETWORKING TECHNOLOGIES I	3	-	2	30	1.5	40	2	50	30	150
4.	MC-22	COMPUTER ORIENTED STATISTICAL METHOD	3	-	2	30	1.5	40	2	50	30	150
5.	MC-23	MANAGEMENT INFORMATION SYSTEM	3	-	-	-	-	30	1.5	-	20	50
6.	MC-24	SOFTWARE ENGINEERING-I	3	1	-	30	1.5	40	2	-	30	100
<b>TOTALS</b>			18	1	6	120	-	180	-	150	160	650

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - V (MCA)

SR. NO.	SUBJECT NO.	SUBJECT NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME				PRACT MARKS	INTERNAL MARKS	TOTAL MARKS
			THEORY Hr	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM Hr.	M.	Hr.			
1.	MC-25	CLIENT SERVER ARCHITECTURE AND INTERFACE-II	3	-	2	30	1.5	40	2	50	30	150
2.	MC-26	MULTIMEDIA	3	-	2	-	-	40	2	30	30	100
3.	MC-27	JAVA PROGRAMMING	3	-	2	30	1.5	40	2	50	30	150
4.	MC-28	NETWORKING TECHNOLOGIES- II	3	1	-	30	1.5	40	2	-	30	100
5.	MC-29	HUMAN RESOURCE MANAGEMENT	3	-	-	-	-	30	1.5	-	20	50
6.	MC-30	SOFTWARE ENGINEERING – II	3	1	-	30	1.5	40	2	-	30	100
<b>TOTAL</b>			<b>18</b>	<b>2</b>	<b>6</b>	<b>120</b>	<b>--</b>	<b>180</b>	<b>--</b>	<b>125</b>	<b>150</b>	<b>650</b>

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - VI (MCA)

SR. NO.	SUBJECT NO.	SUBJECT NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME				PRACT MARKS	INTERNAL MARKS	TOTAL MARKS
			THEORY Hr	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM Hr.	M.	Hr.			
1.	MC-31	COMPUTER GRAPHICS	3	-	2	30	1.5	40	2	50	30	150
2.	MC-32	OPERATIONS RESEARCH	3	1	-	30	1.5	40	2	-	30	100
3.	MC-33	WEB APPLICATION TOOLS-I	3	-	2	30	1.5	40	2	50	30	150
4.	MC-34	OBJECT ORIENTED ANALYSIS AND DESIGN	3	1	-	30	1.5	40	2	-	30	100
5.	MC-35	SOFTWARE PROJECT MANAGEMENT	3	1	-	30	1.5	40	2	-	30	100
6.	MC-36	MINI PROJECT – II	--	-	-	--	--	--	--	100	--	100
<b>TOTAL</b>			<b>15</b>	<b>3</b>	<b>4</b>	<b>150</b>	<b>--</b>	<b>200</b>	<b>--</b>	<b>200</b>	<b>150</b>	<b>700</b>

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - VII (MCA)

SR. NO.	SUBJECT NO.	SUBJECT NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME						
			THEORY Hr	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM Hr.	M.	END TERM Hr.	PRACT MARKS	INTERNAL	TOTAL
1.	MC-37	SYSTEM SOFTWARE	3	-	2	30	1.5	40	2	50	30	150
2.	MC-38	WEB APPLICATION TOOLS -II	3	-	2	30	1.5	40	2	50	30	150
3.	MC-39	DATA WAREHOUSING AND DATA MINING	3	-	-	-	-	30	1.5	-	20	50
4.	MC-40	ELECTIVE-I	3	-	2	30	1.5	40	2	50	30	150
5.	MC-41	ELECTIVE-II	3	1	-	30	1.5	40	2	-	30	100
TOTAL			15	1	6	120	--	190	--	150	140	600

ELECTIVE I – GROUPWARE TECHNOLOGY, ADVANCED JAVA PROGRAMMING

ELECTIVE II – GRID COMPUTING, MOBILE COMPUTING, ARTIFICIAL INTELLIGENCE AND NEURAL NETWORK

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - VIII (MCA)

SR. NO.	SUBJECT NO.	SUBJECT NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME						
			THEORY Hr	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM Hr.	M.	END TERM Hr.	PRACT MARKS	INTERNAL	TOTAL
1.	MC-42	SEMINAR ON CONTEMPORARY ISSUES IN IT	--	--	--	--	--	--	--	--	100	100
2.	MC-43	INDUSTRIAL PROJECT	--	--	---	--	--	--	--	---	---	---
TOTAL			--	--	--	--	--	--	--	---	100	100

**MODIFIED SCHEME FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) COURSE**  
TRIMESTER - IX (MCA)

SR. NO.	SUBJECT NO.	SUBJECT NAME OF THE SUBJECT	TEACHING SCHEME			EXAMINATION SCHEME						
			THEORY Hr	TUTO Hr.	PRACTICAL Hr.	MID TERM M.	END TERM Hr.	M.	END TERM Hr.	PRACT MARKS	INTERNAL	TOTAL
1.	MC-43	INDUSTRIAL PROJECT	--	--	---	--	--	--	--	200	100	300
(CONTINUED FROM PREVIOUS TRIMESTER)												
TOTAL			--	--	---	--	--	--	--	200	100	300

**Regulations for the Degree of Master of Computer Application (M.C.A.)  
w.e.f. academic year 2007-08**

**R. PG. MCA 1 :**

Candidates for admission to the 3 - Year Master of Computer Applications (M.C.A.) course must have passed a Bachelor's degree examination under (10+2+3) pattern either in science or commerce or management or social science or engineering (including technology) or equivalent with at least II class and having obtained not less than 50% marks at the University examination of this University or any other examination recognised as equivalent thereto by this University. Under Social Science all Arts graduates except those having graduated with languages as major subjects will be considered eligible for admission.

**R. PG. MCA 2 :**

The admission to the course will be given by merit obtained in a common admission test conducted by this University or appropriate authority.

**R. PG. MCA 3 :**

Examination for the M.C.A. course will be conducted under the Trimester system. For this purpose, each academic year will be divided into three trimesters.

**R. PG. MCA 4 :**

A candidate who has 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 and the Migration certificate.

**R. PG. MCA 5 :**

No candidate will be admitted to any trimester examination for Master of Computer Applications unless it is certified by the Designated Authority which is the Head of the University Department or Principal of an affiliated college of the University :

- ( 1 ) That he has attended the course of study to the satisfaction of the designated authority.
- ( 2 ) That he has maintained a good conduct and character during the studies.

**R. PG. MCA 6 :**

Candidates desirous of appearing at any trimester examination of the M.C.A. course must forward their applications in the prescribed form to the Registrar, through the designated authority on or before the prescribed date.

**R. PG. MCA 7 :**

For any trimester the maximum marks for the internal and external assessments shall be shown in the teaching and examination scheme. For the purpose of internal assessment, sessional tests or any other suitable methods of assessment may be used by a department.

**R. PG. MCA 8 :**

A candidate will be promoted to the subsequent trimester according to the following scheme:

- (a) A candidate, who has registered for the first trimester examination will be permitted to prosecute his study for the second trimester.
- (b) A candidate, who has cleared all the subjects of the First and Second trimester and who has registered for the third trimester examination will be permitted to prosecute his study for the fourth trimester.
- (c) A candidate, who has cleared all the subjects of the fourth trimester and Fifth Trimester and who has registered for the sixth trimester examination will be permitted to prosecute his study for the 7<sup>th</sup> trimester.
- (d) A candidate who has cleared all the subjects of the third year of MCA would be awarded degree.

**R. PG. MCA 9 :**

No candidate will be allowed to reappear in a trimester examination in which he has already passed. However, the candidate having ATKT will have the option to either reappear in all the subjects or to appear in only the subjects in which he has failed.

If such a candidate exercises the option to appear in all the subjects, the marks obtained by him in the theory and practical/viva examination at the earlier examinations at the same trimester will stand cancelled.

**R. PG. MCA 10 :**

(i) To pass a subject in any trimester a candidate must obtain a minimum of 40% of marks in each head of the subject and 45% of the aggregate of the subject. When a candidate has failed in a subject, the marks in the

sessional and term work head will be carried forward provided the candidate has secured a minimum of 40% marks in the head.

For a subject having Practical/VV as one of the heads of passing, if a candidate fails in the subject and if he passes in the Practical/VV head, he will have the option to either reappear in the Practical/VV examination or to allow the marks obtained in this head to be carried forward. If such a candidate exercises the option to reappear in the Practical/VV examination, the marks obtained by him in the same head at the earlier examinations will stand cancelled.

(ii) A candidate will be eligible for award of First Class with Distinction, First Class or Second Class only if he passes in all the subjects of the Fourth, Fifth, Sixth, Seventh, Eighth and Ninth trimester examination at one sitting. If a candidate passes either the Fourth, Fifth, Sixth, Seventh, Eighth and Ninth trimester examination in parts, he will be awarded Pass class only

For award of class the aggregate marks will consist of the sum of the following:

<b>YEAR</b>	<b>TOTAL Marks</b>	<b>Weightage</b>
<b>First Year Subjects</b> (First Trimester + Second Trimester + Third Trimester)	2000	15%
<b>Second Year Subjects</b> (Fourth Trimester + Fifth Trimester + Sixth Trimester)	2000	35%
<b>Third Year Subjects</b> (Seventh Trimester + Eighth Trimester + Ninth Trimester)	1000	50%
<b>TOTAL</b>	5000	100%

Using the aggregate marks calculated as per the above scheme a class will be awarded as follow:

- (1) 70% or more marks - First Class with Distinction
- (2) 60% or more marks - First Class
- (3) 50% or more marks - Second Class

**Name of the Course** : **Fundamentals of Programming**

**MCA Trimester-I** : **MC01, Credit: 3, Full**

**Course Objective** :

- Basic concepts of C Programming language
- Basic techniques to solve a problem.
- Implement the solution of problem with the help of C – Programming Language.

**Course Content** :

Introductory Concepts: Introduction to computer, Types of Programming Languages, Flowcharts, Algorithms, Introduction to C, C Fundamentals-C Character Set, Identifiers and Keywords, Data Types, Constant, Variables, Declaration, Expression, Statements, Symbolic Constants. Operators and Expression-Arithmetic, Relational and Logical, Unary, Assignment, Conditional, Increment and Decrement, Bitwise, Special and Library Functions. Hierarchy of Logical Operators. Data Input and Output-Reading a Character, Writing a Character, Formatted Input, Formatted Output. Decision Making - Data Control Structure ( If, if-else, else-if ladder), Loop Control Structure (while, for, do-while, break, continue), Case Control Structure ( switch, goto).Functions- What is a Function? , Passing value in a Functions, Scope of a Function, Function Declaration and Prototypes, Call by Value and Call by Reference, Recursion Data Types: Integers-Long and short, Signed and Unsigned, Chars- signed and unsigned, Float and Doubles. Storage Classes: Automatic, Register, Static, External Arrays-Introduction, One-Dimensional Arrays, Two- Dimensional Arrays, Initializing Two-Dimensional Arrays, Multidimensional Array String – What are Strings?, Declaring and Initializing string variables, Reading from the terminal and Writing to the screen, Operations on String, String Handling Functions.Structures and Union- Structure Initialization, Comparison of Structure Variables, Array of Structure, Array within Structures, Structures within Structures, Structure and Function, Union. Pointers-Fundamentals, Pointer Declaration, Passing Pointer to Function, Pointer and One Dimensional Array, Dynamic memory allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Passing Function to Other Function.

**Text Book** :

Let Us C by Yaswant Kanetkar, BPB Publication

**Reference Books:**

Programming in C by Pradip Dey and Manas Ghosh, Oxford University Press

Programming with C by Byron Gottfried, Schaums Outline, Tata McGraw Hill

Programming in ANSI C by E.Balagurusamy, Tata McGraw Hill

**Name of the Course: Fundamentals of Computer Organization**  
**MCA Trimester I : MC02, Credit 3, Full**

**Course Objective :**

The purpose of this course is to give students an understanding of computer organization: the internal structure and operation of a digital computer at the level of memory, registers and flow of control.

**Course Content:**

Number Systems, Boolean algebra, Combinational and sequential circuit  
Arithmetic and logic unit, Memory devices - Buses, interfaces and Control unit  
Instruction formats, Addressing modes, Introduction to microprocessors  
I/O devices: Keyboard, Floppy and Hard Disks, Different types of printers

**Text Book:**

1. Digital Computer Fundamentals (Sixth Edition) - Thomas Bartee , McGrawHill

**Reference Books:**

1. Digital Logic & Computer Design By – Morris Mano
2. IBM PC and Clones By - B. Govindrajalu

**Name of the Course** : **Database Management System – I**

**MCA Trimester-I** : **MC03, Credit: 3, Full**

**Course Objective** :

The course envisages to introduce to the students the basic operations of the database and expose them to the use of access as an important tool and the concepts like data analysis and what-if analysis. Fundamentals of Database, Queries, Reports and Macros using MS Access also form an important constituent of the course objectives.

**Course Content** :

What is database? User interface; Sources of help; Components of DBMS; Application Design Process; Developing the database strategy; Developing the database design; Determining the queries; Determining the forms and reports; Determining other application components. Tables, Import/Export of Database Designing and Creating Tables; Using the table wizards; Setting field and table properties; Indexes and their uses; Setting relationship between tables; Adding and Editing Data; Using existing data. Queries : Select , Parameter , Update , Append , Delete , Crosstab Building Queries; Types of queries; Designing queries; Using the query Wizards; Designing select queries; Designing action queries; Creating other types of queries. Forms Designing and Creating Forms, Using form wizards and builders; Using expressions in forms; Creating subforms; Customizing forms; Displaying and filtering information; Incorporating graphs; Reusing forms; Printing forms. Reports , Macros Creating Reports; Using report wizards; Printing reports; Customizing reports by creating controls, adjusting controls, and setting control properties; Using expressions in reports; Sorting and grouping data within a report; Automating with Macros; Creating and editing macros; Running macros; Creating macro groups; Creating an AutoKeys macro; Creating and customizing menus; Creating a startup macro.

**Text Book:**

- 1) Database Design , Development and Deployment using MS Access ( TMH Publication )  
- Rob & Scaman

**Reference Books :**

- 1) Mastering Office 97 – (Only MS ACCESS)
- 2) Microsoft Online Help

**Name of the Course** : **Discrete Mathematics**

**MCA Trimester-I** : **MC04, Credit: 3, Full**

**Course Objective** :

- To relate the fundamentals of discrete mathematics and its applications to various areas of computer studies.
- To develop mathematical reasoning and analytical thinking which is the base of computer science.

**Course Content** :

Lattices - Relations and ordering, partially ordered sets, Lattices as posets, properties of lattices, Lattices as algebraic systems, sublattices, direct product and homomorphism, complete lattices, bounds of lattices, distributive lattice, complemented lattice.

Boolean Algebra : Introduction, definition and important properties, subboolean algebra, direct product and homomorphism, atoms, antiatoms, Stone's representation theorem,

Boolean expressions and their equivalence, Minterms and Maxterms, Free Boolean algebra, Values of Boolean expressions, canonical forms, Boolean functions, symmetric

Boolean expressions. Applications of Boolean Algebra Introduction, switching algebra, representation of boolean functions, Karnaugh maps, minimization of boolean functions,

Quine\_ McCluskey algorithm. Finite state machines, Introductory Sequential circuits, Equivalence of states, Equivalence and reduction of machines. Predicate Calculus-

Introduction, objectives, predicates, statement functions, variable and quantifiers, free and bound variables, special valid formulas involving quantifiers, Theory of inference for the

predicate calculus. Group Theory Definitions and examples of semigroups, monoids and groups, abelian group cyclic groups, subgroups, permutation groups, coset decomposition of

groups, Normal subgroups, Lagrange theorem, Applications. Fuzzy Sets- Some useful definitions, basic operations on fuzzy sets.

**Text book :**

Discrete Mathematical Structures with applications to Computer Science

Author: J.P. Tremblay, R. Manohar, (Tata McGrawHill)

**Reference Books:**

Discrete Mathematics Richard Johnsonbaug, Fifth Edition

Discrete Methods & Its Applications Kenneth H. Rosen Tata McGrawHill

**Name of the Course** : **Internet Technologies**  
**MCA Trimester-I** : **MC05, Credit 1.5, Half**

**Course Objective :**

The primary objective is to impart knowledge about Internet and there applications. This course also teaches the students to develop static web page using HTML and to develop a project using HTML

**Course Content:**

What is Internet – How Information Travels across – How TCP/IP works – Understanding Internet address and Domains- How the Domain name system works? – How the Routers work - Connecting to the Internet: connecting your computer to Internet – How the Network Computers work – How DSL works

Communicating on the Internet: Working of E-mails – Email spam and Blocking – Internet chat and Instant messaging – Making phone calls on the Internet

Common Internet Tools: Gophers – Telnet – FTP and Downloading Files – Web browsers – Markup language – web host servers – websites work with databases – Audio/Video on the Internet – Working of the Intranet – Firewalls – Cookies – Cryptography and Privacy – Digital certification .

HTML: Requirements for using HTML – Building the foundation – providing structures – Adding context – Using basic style – creating lists – Adding links – adding images to a web page – creating the image map – animation graphics.

Creating tables for data-using tables for page layout – creating frames – using frames for page layout – creating a navigation bar – creating HTML forms – Basics of scripting language – adding layers.

Dynamically changing style – Dynamically changing page content – Using CGI – Using meta information to describe the document – creating widely accessible web pages – validating the HTML – Publishing the web pages.

**Text Book**

1. How the Internet Works – Preston Gralia ,tech media , fourth edition
2. Practical HTML - Lee Anne Phillips, Prentice Hall of India

**Reference Books**

1. The Internet in a Nutshell – Valerie Quercia, Shroff Publishers & Distributors

**Name of the Course:** INTRODUCTION TO COMMUNICATION-I  
**Course, Trimester:** MCA I, TRIMESTER I  
**Subject Code and Credit:** M-06, Half

**Learning Outcome:**

- Ability to understand the importance of communication, its benefits and purposefulness.
- Ability to analyse and plan for a Business Writing Task
- Choose precise and appropriate words to convey the correct meaning and therefore communicate effectively.
- Write clear, correct and concise sentences and paragraph.

**Course Content:**

Introduction to Communication: Functions of Communication, Roles of a Manager, Communications Network and Basics, Informal Communication, Tips for effective Internal Communications, Miscommunication, Effectiveness in Managerial Communication Strategies for Improving Organizational Communication., Case Studies

Language Skills for Effective Communication: Between Verbs and Subjects, Tenses, Use of Preposition and Conjunctions, Idiomatic Use of Prepositions, Words Followed By Prepositions, Participles and Gerunds, Common Errors in English, Adjectives and Adverbs (Confused), Punctuation and Capitalisation, Assignments

Non-Verbal Communication: Forms of Non-verbal Communication, Interpreting Non-verbal Messages, Tips for effective use of non-verbal communication, Case Studies

**Text Book:**

Raman, Meenakshi, Singh, Prakash. Business Communication, India, Oxford University Press, 2006.

**Reference Books:**

Sinha, K.K.. Business Communication. India, Galgotia Publishing Company, 2006.

Murphy, Hildebrandt, Thomas. Effective Business Communication. Mc. Graw Hill, 1997.

Lesikar, V. Raymond, Pettit. D. John. Business Communication: Theory and Application. Delhi: Irwin,1996.

**Name of the Course : Operating System - I**  
**MCA Trimester II : MC07, Credit 3, Full**

**Course Objective :**

This subject provides a basic introduction to computer operating systems. The operating system provides the necessary facilities to allow the application programs to access the computer.

**Course Content:**

What is an Operating System - Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation  
Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms,  
Processes: Process Concept, Process Scheduling - CPU Scheduling: Basic Concepts, Process Synchronization: Background, The Critical-Section Problem, Synchronization  
Hardware, Semaphores - Deadlocks - Security and Protection

**Text Books:**

1. "Operating System Concepts", William Stallings, Pearson, 5th Ed

**Reference Books:**

1. Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
2. Madnick E., Donovan J., "Operating Systems", Tata McGraw Hill, 2001

**Name of the Course : Data and File Structures - I**  
**MCA Trimester II : MC08, Credit 3, Full**

**Course Objective :**

The purpose of this course is to provide the students with solid foundations in the basic concepts of programming: data structures and algorithms.

**Course Content:**

The Use of Data - Logical Data Structures – Primitive and Simple structures – Linear and Non Linear structures - Basic Terminology – Storing strings – character data types - Linear arrays – Representation of linear arrays in memory – Traversing linear arrays – Representation of records in memory - Linear List – Stack - Stack operations – Applications of Stack – Queue – Queue operations - Hashing – Open Hashing – Closed Hashing – Rehashing –Resolving Collisions - Internal sorting - Insertion sort – selection sort – Shell sort – Bubble sort – Merge sort – Quick sort –

Files : File organization – File operations – File systems – File Directories -Managing Buffers – Opening and Closing Files – Storage Devices – Its advantages and Disadvantages

**Text Book:**

1. Theory and Problems of Data Structures – Seymour Lipschutz, Schaums Outline Series in Computers.

**Reference Book:**

1. An Introduction to Data Structures with Applications – Jean Paul Tremblay, Paul G Sorenson

**Name of the Course : Object Oriented Concepts & Programming**

**MCA Trimester - II : MC09, Credit: 3, Full**

**Course Objective:**

- \* To introduce Object oriented concepts and programming so that the student can work on any object oriented language in the future.
- \* To give hands on knowledge of visual object oriented programming.

**Course Contents:**

Object Oriented Concepts - Object Oriented Development; Objects and Classes; Generalization and Inheritance; Polymorphism and Virtual Functions; Classes, Constructors and Destructors - A Simple Class; Objects as Physical Objects & as Data Types; Constructors; Objects as Function Arguments; returning Objects from Functions; Arrays of Objects; Operator Overloading and Inheritance - Overloading Unary Operators; Overloading Binary operators; Data conversion; Inheritance: Derived Class and Base Class; Derived Class Constructors; Overriding Member Functions; Public and Private Inheritance; Levels of Inheritance; Multiple Inheritance; Containership: Classes within Classes; Pointers, Virtual Functions and File Handling - Addresses and Pointers; Pointers and Arrays; Pointers and Functions; Pointers and Strings; Memory Management : new and delete; Pointers to Objects; Pointers to Pointers; Virtual Function; Friend Functions; Static Functions; The this Pointer; Streams; String I/O; character I/O; Object I/O; I/O with Multiple Objects; File Pointers; Disk I/O with Member Functions; Multi File Programs; Templates, Exception Handling and Namespaces - Generic Classes, Creation of Generic Classes, Multiple Arguments with Template, Generic Functions, Multiple Arguments with Generic Functions, Overloading of Template Functions, Exception Handling Mechanism, Multiple Catch Handler, Creation of Namespaces, Nesting of Namespaces, RTTI usage.

**Course Book:**

1. Object Oriented Programming with C++ by E. Balagurusamy
2. Complete Reference C++ by Herbert Schildt - forth edition

**Reference Books:**

1. Object Oriented Programming in Turbo C++ by Robert Lafore (Galgotia - 1994)
2. Let Us C ++ by Yashwant Kanitkar

**Name of the Course** : **Database Management System – II**  
**MCA Trimester-II** : **MC10, Credit: 3, Full**  
**Course Objective** :

The objective is to develop and manage data resource. In order to achieve this, the course provides technical background on computer system management of data. Within the context of the technical background, the course provides instruction in defining data needs, functions on data, user oriented data languages, and management of data within organizations, Understanding of data structure and storage, Data-base management functions and data-base management systems, User oriented data languages.

**Course Content** :

Data Environment Definition of data, issues in managing data. Uses and needs of data in the organization. Defining data needs. Trade-offs between utilization of data and control of data. Basic Technical Concepts and System Resources for Data (a) Introduction : The notion of a data structure, primitive and composite data types, basic machine architecture, character codes. (b) Data Structures : Definition, logical structure, physical implementation, applications and operations for strings, arrays, stacks, queues, linked lists, trees and graphs. Searching and sorting techniques. Data handling facilities of higher level languages. Database Concepts -Database management systems: Introduction and history, CODASYL, hierarchical and relational systems. Role of databases in information systems, goals and objectives of integrated databases. Data base design philosophies. Logical and physical database design conceptual data models. Query interfaces. Logical data models: data abstraction, entity-relationship model, relational database, normalization, data dictionaries and directories. Internal data model : Implementations, CODASYL-DSDL, hierarchical models. Physical data base support, memory management, relational systems, network systems, hierarchical systems. Use and management of data bases Data base management system facilities in building information system application. Use of high-level, user-oriented data language facilities for query, Update and report generation.

**Text Books:**

For Theory:

1. Database System Concept by Hank Korth , S.Sudarshan & Avi Silberschatz

For Practical:

1. Understanding SQL by Martin Gruber, BPB Publication
2. Mastering SQL by Martin Gruber , BPB Publication
3. SQL, PL/SQL Programming by Evan Bayross

**Reference Book:**

1. Database System Concepts by C.J.Date

**Name of the Course** : **System Analysis and Design**

**MCA Trimester-II** : **MC11, Credit: 3, Full**

**Course Objective** :

- To know about different System Development Methodologies.
- Basic concepts of system designing and analyzing.

**Course Content** :

System Concepts- Definition, Characteristics of a System, Elements of a System, Types of a System. The System Development Life Cycle-Recognition of Need, Feasibility Study, Analysis, Design, Implementation, Post Implementation and Maintenance. Role of System Analyst Prototype Development Strategy: Purpose of Prototype, Steps in Prototype Method, Use of Prototype System Analysis-System Planning and Initial Investigation, Information Gathering, The Tools of Structured Analysis (DFD, Data Dictionary, Decision Tree, Structured English, Decision Tables), Feasibility Study, Cost/Benefit Analysis. System Design-The process and stages of system design, Input/Output and Form Design, File Organization and Database Design System Testing- Why System Testing? ,What do we test for? , Nature of Test Data, Test Plan Quality Assurance-Levels of Assurance, Assessing System Reliability. System Implementation and Maintenance -Training, Conversion, Post Implementation and Review. Project Scheduling-Estimation and Management of Development Time, Personnel and Development Management. Hardware/ Software Selection and the Computer Contract Security, Disaster/Recovery and Ethics in System Development

**Text Book:**

System Analysis and Design by Elias M.Awad

**Reference Books:**

Analysis & Design of Information System by James A.Senn

**Name of the Course:** INTRODUCTION TO COMMUNICATION-II  
**Course, Trimester:** MCA I, TRIMESTER II  
**Subject Code and Credit:** M-12, Half

**Learning Outcome:**

- Ability to understand the importance of communication.
- Ability to analyse and plan for a Business Writing Task.
- Choose precise and appropriate words to convey the correct meaning and therefore communicate effectively.
- Write clear, correct and concise sentences and paragraphs.

**Course Content:**

Effective Listening: Meaning of EL, Poor Listening Habits, Types of Listening, Listening Skills, Strategies, Payoffs of, Barriers to Effective Listening, Case Studies  
Business Presentations, Public Speaking, Conversations: Business Presentations, Speeches, Controlling Nervousness and Stage Fright, Conversation Management, Non-Verbal Cues in Conversations, Stressful Conversations, Case Studies  
Business Writing: Basic Principles, Kinds of Business Letters, Writing Effective Memos., Case Studies

**Text Book:**

1. Raman, Meenakshi, Singh Prakash. *Business Communication*. India, Oxford University Press, 2006.

**Reference Books:**

1. Chaturvedi, P.D., Chaturvedi, Mukesh. *Business Communication : Concepts, Cases and Applications*. Pearson Education, 2004.
2. Murphy, Hildebrandt, Thomas. *Effective Business Communication*. Mc. Graw Hill, 1997.
3. Lesikar, V. Raymond, Pettit. D. John. *Business Communication: Theory and Application*. Delhi: Irwin: 1996.

**Name of the Course : Operating System -II**  
**MCA Trimester III : MC13, Credit 3, Full**

**Course Objective :**

Students will become familiar with the usual (internal) policies and mechanisms implemented by operating systems (in the "kernel") and how they impact system performance.

**Course Content:**

Why UNIX – the UNIX environment – structure – basic concepts – common commands – vi editor – Regular files – Directories – File system Implementations –Security and File permissions - Introduction to Shells: UNIX session – standard streams – redirection – pipes – command execution – command line editing - Filters: concatenating files – comparing files – cut and paste – sorting – translating characters – counting - Communications - Device Management - Virtual Devices; Input or Output Devices, Storage Devices, Buffering - General Model of a File - System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File System File-System Interface: File Concept, Access Methods,

**Text Books**

1. Unix and Shell Programming – Behrouz A Forouzan, Richard F Gilberg, Thomson and Brooks/cole

**Reference Books:**

1. Operating Systems – Achyut S Godbole, Tata Mcgraw Hill Publications.

**Name of the Course : Data and File Structures - II**  
**MCA Trimester III : MC14, Credit 3, Full**

**Course Objective :**

The main objective of the course is to teach the students how to select and design data structures and algorithms that are appropriate for problems that they might encounter

**Course Content:**

Trees : Binary Trees – Representing Binary trees in memory – traversing binary trees – traversal algorithms using stack – binary search trees – searching ,inserting and deleting in binary trees – AVL trees – Splay trees Graph : Definitions - Representations of graph – Topological sort – Shortest path algorithm – Breadth first traversal – Applications of Breadth first traversal -Depth First Traversal Applications of Depth first traversal – Minimum spanning tree - Sequential File Organization – Definitions – Storing sequential files – Declaring sequential files Creating sequential files –Retrieving sequential files – updating sequential files performance of sequential files - Sorting and merging files: Merge logic – phases Sort/merge – Natural merges – Balanced merges - Relative File Organization:  
Multi File Organization: Multi-key access – Inverted File Organization – Multi list File Organization – Alternate key indexed sequential files – comparisons and trade off.

**Text book**

1. Fundamentals of Data Structure – Ellis Horowitz, Sartaj Sahani

**Reference Book**

1. Data Structures using C – Aaron M Tenenbaum, Yedidyah Langsan, Mosh J Augenstein, Prentice Hall of India

**Name of the Course** : **Computer Oriented Numerical Methods**

**MCA Trimester-III** : **MC15, Credit: 3, Full**

**Course Objective** :

- To solve linear and non linear algebraic equations, perform operations of calculus, fit curves and solve differential equations, also using a computer.
- To appreciate problems due to rounding errors and convergence.

**Course Content** :

Computer Arithmetic: Floating point Arithmetic, Errors, Measures of Accuracy  
Bisection , False Position, Secant Method, Successive Approximation, Newton Raphson  
Newton Raphson for two variables Polynomial interpolation: Lagrange, Forward difference,  
Backward difference, Divide difference Truncation Error (no derivation), Inverse  
interpolation, Taylor's Series Linear Regression and Non-Linear Regression (Least square  
Curve fitting) Numerical Differentiation and Integration: Differentiation, Integration,  
Trapezoidal, Simpson's 1/3, 3/8. Simultaneous Linear Equation: Direct Method – Gauss  
Elimination Indirect Method – Jacobi, Gauss – Seidal ODE: Euler's Method, Runge-Kutta  
method

**Text Books:**

1. "Numerical Methods" – E. Balaguruswamy (TMH publications)

**Reference Books:**

1. "Numerical Methods" – William S. Dorn & Daniel D. McCracker
2. "Numerical Methods – Problems and Solutions" – M. K. Jain and R. K. Jain
3. "Numerical Mathematical Analysis" – James B. Scarborough
4. "Numerical Methods for Mathematics, Science and Engineering" – John H. Mathews
5. "Applied Numerical Analysis" – Curtis F. Gerald & Patrick O. Wheatley
6. "Computer Oriented Numerical Methods" – V. Rajaraman (PHI publications)

**Name of the Course** : **Database Management System – III**

**MCA Trimester-III** : **MC16, Credit: 3, Full**

**Course Objective** :

The course objective is to understand & develop a database which is reliable and free of redundancies. In order to achieve this normalization of database is being done. Creation of triggers, procedures & functions are also included. The functions performed by the DBA is an important part of it.

**Course Content** :

Normalization : Normalization of relation to 1NF, BCNF & 5NF Forms Data Entry Form Design Designing & usage of forms in Oracle. Triggers, Rules, Procedures, Stored Procedures, Data Base Procedures Creation of triggers; usage of triggers; Creation of stored procedures; use of stored procedures, functions, packages, cursor variables, objects, nested tables, Varrays, built in packages Menus Using of menus in Oracle.SQL & 4GL of RDBMS Use of SQL queries in procedures & functions. Understanding of 4GL of RDBMS. Utilities for DBA, Data base administration Functions of DBA, Importance of DBA, Authority given to DBA. DBMS evaluation Selection, standardization, survey of commercial DBMS, implementation tools.

**Text Books:**

- 1) Database Systems by C.J.Date
- 2) Oracle 9i PL/SQL Programming - Oracle Press

**Reference Books:**

PL/SQL Programming Shroff Publication  
SQL , PL /SQL Programming Ivan Bayross  
PL/SQL in 21 days  
Oracle 8i DBA Bible  
Oracle 8i Complete Reference

**Name of the Course:** INTRODUCTION TO COMMUNICATION-III  
**Course, Trimester:** MCA I, TRIMESTER III  
**Subject Code and Credit:** M-17, HALF

**Learning Outcomes**

- Ability to use technology for communication.
- Ability to analyze and plan for a Business Writing Task.
- To be more creative and active by learning to design effective advertisements.
- To learn Conflict Management, Negotiations and Intercultural Negotiation.

**Course Content:**

Technology-enabled Business Communication: Technology based Communication Tools, Positive and Negative Impact of Technology-enabled Communication, Selection of appropriate Communication Technology, Tips for Effectiveness in Technology based Communication

Communication across Functional Areas: Marketing Communication: Direct v/s Indirect Selling, Project Management Communication, Human Resource Communication, Financial, Corporate Governance, Management Information systems, Case Studies.

Persuasive Strategies in Business Communication: Advertising, AIDA: Master Formula, Planning Advertisements for Results, Effective Online Advertising, Conflict Management, Negotiation, Intercultural Negotiation, Case Studies

**Text Book:**

Raman, Meenakshi, Singh Prakash. *Business Communication*. India, Oxford University Press, 2006.

**Reference Books:**

1. Chaturvedi, P.D., Chaturvedi, Mukesh. *Business Communication* : Concepts, Cases and Applications. Pearson Education, 2004.
2. Murphy, Hildebrandt, Thomas. *Effective Business Communication*. Mc. Graw Hill, 1997.
3. Lesikar, V. Raymond, Pettit. D. John. *Business Communication: Theory and Application*. Delhi: Irwin: 1996.

**Name of the Course** : **Mini Project-I**  
**MCA Trimester-III** : **MC18, Credit: 3, Full**  
**Course Objective** :

The objective of the project is to enable the students to create a small sized software using C/C++. They will be motivated to apply theoretical and practical concepts that have been acquired in the previous trimester. The team size is at the most 2.

**Name of the Course** : **Client Server Architecture And Interface - I**  
**MCA Trimester-IV** : **MC19, Credit 3, Full**

**Course Objective :**

The purpose of this course is to give students an understanding of Client/Server architecture with there application tools. The course also teaches the students about the steps in System Development Life Cycle

**Course Content:**

Client-Server Architecture

Distributed processing; Cooperative processing; Client/Server processing; Peer-to-peer processing; Client/Server architecture; Time sharing; Resource sharing; How do the client and server communicate ?; Differences between a database server and a file server; Database server architecture; open systems interconnect (ISO) model; Application Architecture : Information system architecture; Function (application) architecture; Data architecture; Network(technology)architecture; application partitioning models.

Client/Server Application System Development Life Cycle (SDLC)

A mission critical application; Functional specification; Business rules; Database design; Data distribution; Prototyping; User interface design; Front-end module design; Reusable modules; Goals of the design stage; Where is user interface (UI) design in the SDLC ?; The usability iceberg Process for doing UI design, Requirement gathering; Multiple prototypes

Client-Server Applications Tools

Visual Basic : Objects, properties, methods, and events; Form, control, and application; Properties and methods of a form; an Object Browser, and basic controls; Changing properties and calling methods with code; adding code to event procedures; Control accessibility; Interacting with the user; Working with code statements; Variables and Procedures : Variables; Constants; Converting data types; procedures; Debugging; Types of errors; Debugging toolbar; Break mode; Debug window; Controlling Program Execution; Conditional statements; Looping statement; Working with Controls : Additional standard controls; Customs controls; Menus; Status Bars and Toolbars; Creating a menu; Pop-up menus; Data Access with Data Control : Overview of a database (table, field record key); Data control overview; Viewing records; Data Form Designer; Entering and editing records; Drag and Drop Editing; Steps for adding drag and drop functionality

**Text Book:**

1. Special Edition Using Visual Basic 6 - Silver, Spotts, PHI SPECIAL EDITION

**Reference Books :**

1. Visual Basic 6 Programming : Black Book – Steven Holzner
2. Guide to Client Server by Joe Salemi (BPB-94)

**Name of the Course** : **Enterprise Resource Planning**  
**MCA Trimester - IV** : **MC20, Credit: 1.5, Half**  
**Course Objective** :

- To provide the basic aspects of ERP System.

**Course Content** :

Introduction to ERP Systems: Basic issues, approach and data base implementation, Review of DBMS and Transaction processing concepts ERP modules, production planning, sales and distribution, material management, plant maintenance, financial, costing and human resources Business Processes and integration across functions, Issues in customizing ERP systems for organizations Top Management concerns and ERP systems, Introduction to Extended ERP (ERP II) /Advanced Planning Systems ERP implementation? Strategy and steps, Issues in utilization enhancement.

**Text Books:**

- Concepts in Enterprise Resource Planning, Brady, Monk, and Wagner, Course Technology, Inc., 2001

**Reference Books:**

- ERP: Making it Happen – The Implementers’ Guide to Success with Enterprise Resource Planning, Wallace and Kremzar, John Wiley & Sons, Inc., 2001

**Name of the Course** : **Networking Technologies – I**  
**MCA Trimester - IV** : **MC21, Credit: 3, Full**

**Course Objective:**

- \* To introduce the concept of electronic data transmission, the representation of data in a transmission system and the design of communication methods in a distributed computer system.
- \* To discuss the possible network configurations and control strategies necessary for various applications. Protocols, architectures and transmission alternatives, communication environment, regulatory issues, network pricing and management.

**Course Content:**

Fundamentals of Data Transmission, Communication Media - The Structure and Types of Communication Systems, Communications Systems and Data Communication, Basics of Network, History of Networks, Network Topology; LAN, MAN, WAN, Rules, Models, Layers and 7-layer OSI Model, The Communication Channel; Electromagnetic Waves; The Electromagnetic Spectrum; Bandwidth and Channel Capacity; Error Detection and Correction, Communication Protocols - The Nature of Errors; Parity; Cyclic Redundancy Codes; Dealing with Errors, Data Link Layer Protocols; MAC layer and Network layer - ALOHA, CSMA\CD, WDMA, MACA and MACAW Protocols; Transport layer and Application Layer - TPDU, TSAP and NSAP, Three Way Handshake, Two-Army Problem, DNS, Name Servers, Resolvers, E-mail, SMTP, MIME, POP3; Network Security - Security Features, Cryptography, RSA.

**Course Book:**

1. Computer Networks by Andrew S. Tanenbaum – 4<sup>th</sup> Edition.

**Reference Book:**

1. Data Communications and Networking by Behrouz Forouzan – 2<sup>nd</sup> Edition

**Name of the Course** : **Computer Oriented Statistical Methods**

**MCA Trimester-IV** : **MC22, Credit: 3, Full**

**Course Objective** :

- To develop familiarity with the different statistical methods used in problem solving.
- Apply the statistical techniques in real situations with the help of computer.

**Course Content** :

Probability theory: Random events, various definitions of probability, complementation rule, addition rule, mutually exclusive events, permutations and combinations, conditional probability, multiplication rule for independent events, Baye's rule. Random variables and their Distribution Discrete and continuous random variables, mathematical expectation, joint probability distribution of two random variables, covariance independence of random variables, Chebyshev inequality, binomial, hypergeometric, geometric, poisson, normal and exponential distribution. Statistical Inference Sampling distribution, point estimation and confidence interval estimation 2 Testing of hypothesis about mean for small and large samples, X test, non parametric methods. Statistical Methods Used In Industrial Practices Analysis of variance; analysis of variance in two way classification model, introduction of experimental designs, Randomized block design, Factorial experimentation, Introduction to multivariate Analysis, multiple regression, factor analysis, discriminant analysis. Time series Analysis Time series, various components of a time series, moving average method.

**Text Books:**

- Statistics for Management by Levin and David S. Rubin

**Reference Book:**

- Statistics for Management by Jit Chandran

**Name of the Course** : **Management Information System**

**MCA Trimester-IV** : **MC23, Credit: 1.5, Half**

**Course Objective** :

- To develop familiarity with the different information system.
- Relationship between different information system and how they help in decision making.

**Course Content** :

Introduction to MIS-Introduction, Role and Importance of Management, Process of Management. Basics of MIS- Decision Making, Information, System Development of MIS Applications of MIS- Manufacturing Sector, Service Sector, Decision Support System, Enterprise Management System. Technology of Information System- Data Processing, Transaction Processing, Application Processing, Information System Processing, TQM of Information System, Human Factor and User Interface, Real time System and Design, Programming Language for System Coding. MIS and Client Server Architecture, MIS and Business Process Re-engineering. MIS and E-Business, MIS in Web Environment.

**Text Book:**

- Management Information System - W.S. Jawadekar

**Reference Books:**

- Management Information System-Solving Business Problem with Information Technology – Gerald V. Post, David L. Anderson
- Information System for Modern Management IIIrd edition Robert G Murdick & Joel E Ross.
- Business System For Micro Computer - William D Harmisen (PHI Publication)

**Name of the Course** : **Software Engineering -I**  
**MCA Trimester-IV** : **MC24, Credit 3, Full**

**Course Objective :**

The course envisages introducing to the students the conventional methods for software engineering including analysis, design and testing strategies and exposing them to the project management concepts. Risk analysis, software configuration management and software quality assurance also form an important constituent of the course objectives.

**Course Content:**

Introduction to software engineering - A Generic view of process: A Layered Technology, Process framework, Capability Maturity Model Integration, Process Assessment, Personal and Team process models, Process technology, Product and Process- Process Models: Prescriptive models, Waterfall model, Evolutionary models, specialized process model

An Agile View of Process - Software Engineering Practice System Engineering: Computer based system, Software Engineering Hierarchy, Business Process Engineering, Product engineering, system Modeling – Hatley – Pirbhai Modeling

Requirement Engineering: A Bridge to Design and Construction, Requirement engineering tasks, Initiating, Eliciting, Negotiating, Validating Requirements  
Building Analysis Model: Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Flow oriented Modeling Behavioral Model  
Design Engineering: Design Process and Quality, Design Concepts, Design Model – Data design, Architectural Design, Interface Design Elements

Creating An Architectural Design: Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design – Representing system in context, Assessing Alternative Architectural Design, Mapping Data Flow into a Software Architecture  
Modeling Component Level Design: Component – The Conventional View, Designing Class Based components, Designing Conventional Components  
Interface Design: Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design steps – Design Steps and Issues

Testing Strategies: Strategic approach for Software Testing, Strategic Issues, For Conventional Software, Validation, System testing, Art of Debugging  
Testing Tactics: Testing Fundamentals, Black Box Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Testing for specialized Environment.  
Product Metrics: Software Quality, Framework for Product, Metrics for Analysis Model, and Metrics for Design Model – Architectural model, Component-Design Model, User-interface design model, Metrics for Source code, Metrics for Testing – Halstead Metrics applied to testing

**TEXT BOOKS:**

1. Roger .S. Pressman "Software Engineering: A Practitioners Approach", 5e, TMH.

**REFERENCES:**

1. Pfleeger, "Software Engineering: Theory and Practice", PEA.
2. Peter Pedrycz, "Software Engineering: An Engineering Approach", John Wiely.
3. Ghezzi, Jazayere, "Fundamentals of Software Engineering", 2e, PHI.
4. Sommerville, "Software Engineering", 6e, PEA

**Name of the Course : Client Server Architecture And Interface - II**  
**MCA Trimester-V : MC25, Credit 3, Full**

**Course Objective :**

The primary objective is to deal mainly with client server technologies used in the business as well web based applications. The course will also consist of development of a project with VB as front end and any DBMS as back end, they need to create at least one active-x control for the project. The project should also be given web interface using ASP

**Course Content:**

**ActiveX Components**

Visual Basic : Objects, properties, methods, and events; Creation of ActiveX controls; Properties and methods of a control; and basic controls; Changing properties and calling methods with code; adding code to event procedures; Control accessibility.

**Client-Server Applications Tools**

Active Server Pages : Objects, properties, methods, and events; Form, control, and application; basic controls; Changing properties and calling methods with code; adding code to event procedures; Control accessibility; Interacting with the user; Working with code statements; Variables and Procedures : Variables; Constants; Converting data types; procedures; Debugging; Types of errors; Controlling Program Execution; Conditional statements; Looping statement; Working with Controls : Additional standard controls; Data Access with Data Control : Overview of a database (table, field record key); Data control overview; Viewing records; Data Form Designer; Entering and editing records; Drag and Drop Editing; Steps for adding drag and drop functionality

**Text Books:**

1. Special Edition Using Visual Basic 6 - Silver, Spotts, PHI SPECIAL EDITION
2. Mastering in ASP

**References Books:**

1. Books-On-Line for Microsoft Visual Basic 4.0
2. Guide to Client Server by Joe Salemi (BPB-94)

**Name of the Course** : **Multimedia**  
**MCA Trimester-V** : **MC26, Credit: 1.5, Half**  
**Course Objective** :

- To develop familiarity with the different designing of graphics.

**Course Content** :

Introduction to Multimedia: hardware and software requirements components of multimedia file formats Hardware, Networking, Software-Applications, Environment, CD-Rom, WROM Optical Drives, Flat Panel Displays. Non Temporal Media: Text, Hypertext, Images, Images Operations, CCD Cameras, Scanner Multimedia graphics worlds of colors ,digital imaging fundamentals ,digital imaging development and editing Audio: Digital Audio, Wave Files, Music, MIDI audio editing and recording technologies Graphics Animation :Tweaking, Morphing, Simulating Acceleration, Motion Specification Video: Analog Video-Operations, Digital Video, Compression, MPEG, JPEG, Operations Multimedia Authoring Systems. Hardware, Networking, Software-Applications, Environment, CD-Rom, WROM Optical Drives, Flat Panel Displays. Multimedia project team, Programming with Flash MX

**Text Books:**

- Macromedia Flash MX 2004: The Complete Reference, Second Edition (Complete Reference)(for FLASH)
- Multimedia magic by S Gokul

**Reference Books:**

- Multimedia system design by Kiran Thakkar
- Multimedia computing , communication and application by Ralf Steinmetz

**Name of the Course** : **Java Programming**  
**MCA Trimester-V** : **MC27, Credit: 3, Full**  
**Course Objective** :

- To develop familiarity with the Java Language.

**Course Content** :

Java Concepts - What is JAVA, its Characteristics, JVM, JRE, Concepts – Polymorphism, Abstraction etc. Threading and Applet Threading, creating a thread, working with thread; The Applet; The Java Workshop; Java Classes; a Java Object; a Java Class; Putting Classes and Objects to Work; Deriving a New Class; Declaring a TextField Object; The init()Function; the new Operator; Java Constructors, Using Panels and other tools in Applets. File Handling File Features, File Opening, File Closing, Appending in a File, Copying contents of one file to another; Socket Programming Creating Sockets, Client and server communication, connecting multiple clients and multiple servers. GUI Programming (AWT) Creating a Window, Dealing with Frames and its objects, Declaring a Button Object; Handling Java Events; Grid Layout; Check Boxes; Radio Buttons; Panels; Scroll-bars; Choice Controls; Scrolling Lists; GridBag Layout; Pop-up Windows; The Frame Class; Menus; Dialog Boxes

**Text Books:**

1. Complete Reference – Java
2. Teach Yourself Java

**Reference Book:**

1. Special Edition using Java 2 platform

**Name of the Course :**        **Networking Technologies – II**

**MCA Trimester - V :**        **MC28, Credit: 3, Full**

**Course Objective:**

- \* To introduce the concept of Data Communication through TCP/IP Model.
- \* To discuss the possible network configurations and control strategies necessary for various applications. Protocols, architectures and transmission alternatives, communication environment, regulatory issues, network and management.

**Course Content:**

TCP/IP Model and Concepts - Overview of the Internet; TCP/IP model, Layers in TCP/IP model, Address classes; Guideline for network addressing and host addressing; ARP, RARP, ICMP -Subnet Addressing; subnet mask; Defining a range of network IDs; Static versus dynamic IP routing; IP routing on Windows NT; Building a routing table; IP address Resolution : Resolving a local IP address; Resolving a remote IP address; ARP cache; VPN and DNS - Virtual Private Networks, Their working and the Advantage, Domain Name System, Name to IP address Mapping and vice-versa. World Wide Web (WWW) Service. DNS Overview; History; function; How DNS fits Internet architecture; Overview of security architecture; BOOTP and DHCP -BOOTP, DHCP, Lease mechanism; Planning a DHCP environment; Installing DHCP; Configuring a DHCP scope; Internet Services, FTP, Telnet, HTTP - Overview of the Internet; Routers using TCP/IP; Host-to-host communications : How the Internet works; URLs; Internet Services: e-mail; Internet; RLogin; rpc; FTP Services; FTP architecture connection-oriented and connection-less protocols; Performance Monitoring; Gopher Service;

**Course Book:**

1. TCP/IP Volume I “Principles, Protocols and Architecture” by Douglas E. Comer, Fourth Edition

**Reference Book:**

1. TCP/IP Protocol Suite by Behrouz Fourozan, Second Edition

**Name of the Course :** Human Resource Management

**MCA Trimester - V :** MC29, Credit: 1.5, Half

**Course Objective:**

This Course has been designed with the view of cultivating awareness about Human Resource Management, problems & methods to deal with them. An insight into the various genuine demands & environment of work place, recruitment process & its implications is provided.

This will increase the Leadership Qualities & instill a effective management capability so that the Student can become effective Project & Team Leaders promoting team effort & contributing to the growth of the Company & also to that of the Society.

**Unit-1: Introduction to Human Resource Management.**

- Classification of Resources, Important of various Resources in Organization.
- History & Significance of Human Resources.
- Traditional Human Resource (Pro's & Con's).
- Current Human Resource Scenario in India with few Case Studies.

**Unit II. Job Evaluation.**

- Concept, Scope & Limitations of Job Evaluation.
- Job Analysis & Job Description.
- Job Evaluation Methods.

**Unit III. Selection & Recruitment.**

- Process & Criteria of Selection
- Recruitment Methods.
- Performance & Potential Appraisal.
- Transfer, Promotion & Reward Policies.

**Unit IV Training, Employee Recognition, Motivation & Discipline.**

- Employee orientation - Personal, management and leadership development.
- Training tools
- Motivating and recognizing staff members - Performance assessments and reviews –
- Disciplinary action Professional development:
- Training and development activities - Individual career development plan - Management trainee programs.
- Legal termination - When an employee quits - Cuts and layoffs.

**Unit V Human Resource Scenario in Information Technology.**

Current Scenario of HRM in IT Companies with Case Studies.

**Name of the Course :**       **Software Engineering -II**  
**MCA Trimester-V :**        MC30, Credit 3, Fulll

**Course Objective :**

The course guides the students to know about Web Engineering and the Project Management techniques. Students will be guided to calculate the Metrics and the Estimation of the project. Software quality assurance also form an important constituent of the course objectives

**Course Content:**

Web Engineering: Initiating a Webapps Project - Analysis for Webapps - Design for Webapps - Testing for Webapps

Project Management: Metrics for Process and Projects – (Except Object Oriented, Used case oriented metrics)

Estimation: Observation and Estimation, Project Planning Process, Software scope anf Feasibility, Resources, Project estimation, Decomposition Technique – Software sizing, Problem based, LOC based, FP based, Process based Estimation Project Scheduling: Basic concepts, Project scheduling, Defining Task set for Software project, Task Network, Scheduling – Timeline chart, tracking the schedule

Quality Management

Change Management: Software Configuration Management, The SCM Repository, The SCM Process

**TEXT BOOKS:**

1. Roger .S. Pressman "Software Engineering: A Practitioners Approach", 5e, TMH.

**REFERENCES:**

1. Pfleeger, "Software Engineering: Theory and Practice", PEA.
2. Peter Pedrycz, "Software Engineering: An Engineering Approach", John Wiely.
3. Ghezzi, Jazayere, "Fundamentals of Software Engineering", 2e, PHI.
4. Sommerville, "Software Engineering", 6e, PEA

**Name of the Course :** Computer Graphics  
**MCA Trimester-VI :** MC31, Credit: 3, Full  
**Course Objective :**

- Basic concepts of Computer Graphics.
- To develop familiarity with the different Algorithms of graphics.

**Course Content :**

Introduction, What is computer graphics? Elements of graphics workstation, Video Display Devices- Raster Scan Systems, Random Scan Systems, Input Devices, Graphics Software Coordinate Representations, Fundamental problems in Geometry Algorithms: Line drawing algorithms- DDA Algorithm, Bresenham's Line Algorithm, Frame Buffers, Circle and ellipse generating algorithms- Midpoint Circle Algorithm, Filling- Filled Area Primitives, Scan-Line Polygon Fill Algorithm, Inside-Outside Tests, Scan-Line Fill of Curved Boundary Areas, Boundary-Fill Algorithm, Flood-Fill Algorithm, Character Generation, Attributes of lines, curves, filling, characters etc. Graphics Primitives, Primitive Operations, The Display-File Interpreter-Normalized Device Coordinates, Display-File Structure Display-File Algorithms, Display Control, Polygons- Polygon Representation Attributes of Output Primitives, Line Attributes- Line Type, Line Width, Pen and Brush Options, Line Color, Color and Grayscale levels- Color Tables, Grayscale, Area-Fill Attributes- Fill Styles, Pattern Fill, Soft Fill, Character Attributes, Text Attributes. 2D Transformations: Matrices, Translation, Rotation, Scaling Transformations Homogeneous Coordinates, Rotation about an arbitrary point, Scaling w.r.t. fixed point, Reflection, Shearing. Two-Dimensional Viewing, The viewing pipeline, Viewing Coordinate Reference Frame, Window-to-viewport Coordinate Transformation, Two-Dimensional Viewing Functions, Clipping Operations- Point Clipping, Line Clipping, Cohen-Sutherland Line Clipping, Polygon Clipping, Sutherland-Hodgeman Polygon Clipping Three-Dimensional Concepts: Three-Dimensional Display Methods- Parallel Projection, Perspective Projection, Visible Line and surface Identification, Surface Rendering, Three-Dimensional Object Representations- Bezier Curves and surfaces, B-Spline Curves and surfaces 3D Transformations: Matrices, Translation, Rotation, Scaling Transformations Rotation about an arbitrary axis, Reflection, Shearing. Three-Dimensional Viewing, The viewing pipeline, Projection-Parallel and Perspective

**Text Book:**

- Computer Graphics, Donald Hearn & M. Pauline Baker, Prentice Hall of India

**Reference Books:**

- Computer Graphics, Steven Harrington, McGraw-Hill
- Computer Graphics Principles and Practice, J.D. Foley, A. Van Dam, S.K. Feiner & R.L. Phillips, Addison Wesley
- Principles of Interactive Computer Graphics, Willaim M. Newman, Robert F. Sproull, McGraw-Hill.
- Introduction to Computer Graphics, J.D. Foley, A. Van Dam, S.K. Feiner, J.F. Hughes & R.L. Phillips, Addison Wesley

**Name of the Course** : **Operation Research**  
**MCA Trimester-VI** : **MC32, Credit: 3, Full**  
**Course Objective** :

- To introduce and exercise a range of analytical modeling techniques useful in decision making in the system design environment.
- To consider the function of such models as guides for data collection, structures for data manipulation and as systems for testing assumptions and generating a variety of alternatives.
- To identify the problems of data collection, maintenance and accuracy when using models to assist decision making activities.

**Course Content** :

Introduction to Operations Research – Definitions – Model Formulations. Linear Programming The Simplex method - Graphical Method. Duality in Linear Programming - Formulation of Dual linear Programming problem. Integer Linear Programming Types of Integer Programming problem – Gomory’s cutting plane method. Transportation Problem- Mathematical Model of transportation Problem - Methods for finding initial solution - Test for optimality – Variations in transportation problem. Assignment Problem - Mathematical Model of Assignment Problem – Solution methods of assignment problem – Variations of the assignment problem. Sequencing Problem- Notations, Terminologies – Processing n jobs through 2 machines - Processing n jobs through 3 machines - Processing n jobs through m machines - Processing 2 jobs through m machines. PERT and CPM Definitions for PERT and CPM – Basic Differences between PERT and CPM- Phases of Project Management- PERT/CPM Network components and precedence relationships – Critical Path Analysis. Queuing Theory Essential features of Queuing system – Performance measures of queuing system – Probability Distributions in Queuing Systems – classifications of queuing model – Single server queuing models Dual-Simplex Method Standard Form for Dual Simplex method

### **Text Book**

- “Operations Research – Theory and Applications”- J. K. Sharma (Macmillan Books)

### **Reference Books**

- “Quantitative Techniques for Management” – N. D. Vohra (TMH publications)
- “Operation Research” – Hiller & Libermann

**Name of the Course** : **Web Application Tool-I**  
**MCA Trimester-VI** : **MC33, Credit: 3, Full**  
**Course Objective** :

- Basic knowledge of creating Web Page through .NET.
- Easy, static and dynamic web page programming.

### **Course Content**

Introduction of .NET Frameworks Overview – History of framework -versioning and deployment , memory management , CLR , IL Assembler/Disassembler , metadata , Interface of VS.NET , IDE and their overview Introduction to VB.Net: Features of VB.Net, Writing Programmes in VB.Net, Compiling and execution, Command prompt, Intro to Assemblies and Namespace, Base class Libraries, Data types, Option statements, Array, Sub Programmes Application development with various controls GUI Application Development: Intro to System Window, Different types of controls – Web controls ( textbox ,combo box , list box, radio button , check box , scroll bar , track bar , common dialog boxes for windows applications , rich text box, list view ,tree view , timer , picture box , perform their validation with each tool ) Form, DLL, Event Driven Programming, Rich text box, Dialog, Boxes, Toolbar, Working with context menu, Main menu and MDI Form ADO.NET: Intro to Managed Data Providers, Data Reader Programming, Drawbacks of Recordset, Dataset and Data Adapter, Datagrid with sorting, Datagrid with paging, Customizing Datagrid, Typed Dataset, Inline editing with Datagrid, Dataset serialization and Deserialization, Write XML and Read XML methods, Repeater Control, Data list control

### **Text Book**

1. Mastering VB.Net – Evangelos Petroustos, BPB publications

### **Reference Book**

1. Programming in VB.Net - Julia Case Bradley, Anita C. Millspaugh, Tata Mc Graw hill publications.

**Name of the Course** : **Object Oriented Analysis and Design Methodologies**

**MCA Trimester-VI** : **MC34, Credit: 3, Full**

**Course Objective** :

- Basic knowledge of Unified Modeling Language.
- Familiarity with implementation of UML with the help of Java Programming.

**Course Content** :

Introduction to Object Oriented Modeling Techniques- Object Oriented Development; The Object Modeling Technique ; Objects and Classes; Links and Associations; Advanced Link and Association Concepts; Generalization and Inheritance; Grouping Constructs; Aggregation; Abstract Classes: Generalization as Extension and Restriction; Multiple Inheritance; Metadata; Candidate Keys; Constraints Object Modeling Object-Oriented Style; Reusability; Extensibility; Robustness; Class Definitions; Creating Objects; Calling operations; Using Inheritance; Implementing Associations; Object-Oriented Language Features. Dynamic Modeling Events, Actions, State Transition Diagram Functional Modeling Data Flow Diagrams, Activity Diagrams, Component Diagram, Deployment Diagram Object Oriented Databases and Case Studies What is Object Oriented Database? Difference Between Conventional and Object Oriented Database

**Text Books:**

- Object Oriented Modeling and Design by Rambaug
- The Unified Modelling Language – User Guide by Booch, Rambaug and Jacobson

**References :**

- Teach Yourself UML 3<sup>rd</sup> Edition
- UML in a nutshell

**Name of the Course** : **Software Project Management**  
**MCA Trimester-VI** : **MC35, Credit: 3, Full.**

**Course Objective:**

The main goal of Software Project Management is to enable Students to work efficiently towards successful completion of the Project. The course intends to give an outline of skills required for project management, risk management, stringent quality standards & testing techniques. This subject has been introduced to merge the concepts giving a practical implementation of System Analysis & Design with Software Engineering.

**Course Contents:**

Introduction to CMM Model: What is CMM Model, Five Stages of CMM Model, KPA's of all the stages, Quality Triangle

Requirement Management and Planning: Requirement Elicitation, Requirement Analysis, Requirement Negotiation, Requirement Specification, SRS, Project Management Plan.

Software Quality, Configuration and Risk Management: Software Quality Assurance, SQA Plan, CMP – Configuration Plan, Risk MMM Plan – Risk Mitigation, Monitoring and Management Plan

Software Estimation, Analysis and Design: Top Down Estimation, Bottom Up Estimation, HLD – High Level Design.

Peer Reviews, Auditing and Project Closure: Peer Reviews, Why Auditing, Auditing Process, Project Closure Process

**Text Book:**

1. CMM in Practice By Pankaj Jalote

**Reference Books :**

1. Software Project Management – from Concept to Deployment by Kieron Conway
2. Software Project Management – a real world guide to success by Joel Henry.

**Name of the Course** : **Mini Project-2**  
**MCA Trimester-VI** : **MC36, Credit: 3, Full**  
**Course Content** :

The objective of the project is to help the student develop the ability to apply theoretical and practical tools / techniques to solve a problems related to any area using JAVA/Dot Net. The team size is at the most 2.

**Name of the Course** : **System Software**  
**MCA Trimester - VII** : **MC37, Credit: 3, Full**  
**Course Objective** :

- \* To introduce the working and architecture of system software so that it may help in doing assembly programming.
- \* To give students practical “hands-on” experience of System Software’s like Compilers and Assemblers.

**Course Content:**

Introduction to Language Processors and their Grammars - Language Processors, Program Generation, Program Interpretation, Analysis and Synthesis, Grammars, Type Grammars; Scanners and Parsers - FSA, DFA, Regular Expressions, Top – Down Parsing, LL-1 Parsing, Recursive Descent Parsing, Bottom – up Parsing; Assemblers and Macro Processors - Features of assembly language, Mnemonics table, Symbol table, Directives, Location counter, Methods of translation, Macros in assembly language, Macro name table, Macro definition table, Macro with symbols, nesting of macros; Compilers, Linkers and Loaders - Introduction to stages of compiler, Parsing, Syntax analysis, Lexical analysis, Code generation, code optimization, Intermediate code, Various linking techniques, Various Loading techniques, relocatability; Device Drivers- Requirements of drivers, Driver architectures, Device drivers.

**Course Book:**

1. Systems Programming and Operating Systems by Dhamdhare
2. IBM PC Assembly Language Programming by Peter Able

**References:**

1. System Programming by Donovan

**Name of the Course** : **Web Application Tool – II**  
**MCA Trimester - VII** : **MC38, Credit: 3, Full**  
**Course Objective** :

**Course Content:**

Introduction to Asp.Net: Why .Net, Introduction to .Net Framework, Basic functionality of CLR, MSIL, CTS & CLS, .NET Languages, System Requirements Intro to Web Technologies: HTML, Client side scripting languages, IIS Architecture Asp.Net Introduction: Asp Vs Asp.Net, Page and Import Directive, Inpage Technique and code behind technique, Client side control Vs Server side controls Server side Controls: HTML server controls programming using inpage technique, View state architecture, Asp.Net Page Execution Architecture – Asp.Net worker process, Page Life cycle events, Vs.Net Vs Web Matrix, Types of Web server controls – Working with basic controls, Label, Text Box, Button, etc. Working with Rich controls – Calendar, Adrotator, Validation controls. State Management: Page submission, Cookies, Session and Application events, Global.ASAX Caching: Importance of caching, Asp 3.0 Support for Caching, Asp.Net Tracing: Page level, Application level, Security in Asp.Net: Authentication and Authorization, Window based Authorization, From Based, Passport. Intro to Mobile Programming Intro to Delegates, Multi Threading, Windows Control Library, Crystal Report

**Text Book**

1. ASP.Net 2.0 Black Book – Dreamtech Software team, Dreamtech Press.

**Name of the Course** : **Data Warehousing and Mining**

**MCA Trimester-VII** : **MC39, Credit: 1.5, Half**

**Course Objective** :

This Course has been designed to provide students with enough knowledge to extract data from large databases. The different algorithms provide knowledge to the student regarding the process of Knowledge discovery & data mining which is one of the emerging fields of Information Technology.

**Course Content** :

Overview and Concepts: Need for data warehousing, Basic elements of data warehousing, Trends in data warehousing. Planning and Requirements: Project planning and management, Collecting the requirements. Architecture And Infrastructure: Architectural components, Infrastructure and metadata. Information Access And Delivery: Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web. Implementation And Maintenance: Physical design process, data warehouse deployment, growth and maintenance. Data Mining: Introduction: Basics of data mining, related concepts, Data mining techniques. Knowledge Discovery: KDD Process Data Mining Algorithms: Classification, Clustering, Association rules. Web Mining: Web Content Mining, Web Structure Mining, Web Usage mining. Data Mining Primitives, Languages, and System Architectures Application and Trends in Data Mining: Applications, Systems products and research prototypes, Additional themes in data mining, Trends in data mining

**Text Books :**

- Data Mining ,next generation challenges and future directions by kargupta , joshi
- Building the data warehouse by William H. Inmon

**References:**

- Paulraj Ponnian, Data Warehousing Fundamentals?, John Wiley.
- M.H. Dunham,Data Mining Introductory and Advanced Topics?, Pearson Education.

## **Elective-1**

**Name of the Course : Groupware Technologies**

**MCA Trimester - VII : MC40, Credit: 3, Full**

### **Course Objective:**

To introduce Groupware technology concepts and programming so that the student can work on any groupware supported language in the future. This course will help the students as the course is becoming popular overseas also.

### **Course Content:**

Basic Concepts - About Groupware Technology, Tools used, Why it is useful?; GUI Designing - Formatting a Document; Using Your Workspace; Using Help; Using View and Folders; Using Document Tools; Working with Folders; Replicating a Database; Searching for Information; Enhancing the Documents; Web Navigator ;; Mail Management - Mail Basics, Using Mail; Sending Multiple mails, Storing Mails, Acknowledgement, Mail Routing; Shared Mail; Mail Troubleshooting Tools; Database Handling - A Groupware Application; Designing a Database; Creating a Database; Planning a View; Creating a View; Creating a Folder; Creating Formulas; @ Functions; Using Formulas to Edit and Validate Data; Enhancing a Form; Enhancing a View; Adding New Views; Automating Forms and Views; Creating a Navigator; Creating Agents; Implementing Security; Creating Database Help; System Administration - The Environment; Named Networks & Domains; Security and Naming : ID; the Replication Process; Setting Up Replication; Factors that Affect Replication; Scheduling Replication; Using User Setup Profiles and location Documents Enhancing Remote Access with Passthru and Remote LAN; Maintaining Database Integrity; Using the Administration Process.

### **Course Book:**

1. Application Developers Manual Series 4 (LOTUS)

### **Reference Book:**

1. System Administrators Manual Series 4 (LOTUS)

## Elective-1

**Name of the Course** : **Advanced Java Programming**

**MCA Trimester-VII** : **MC40, Credit: 3, Full**

**Course Objective** :

- To give practical approach to different Advanced Java Technologies.

**Course Content** :

JAVA BEANS -Introduction ,Component Model Services ,The Bean Box ,The jar utility , A Simple Bean ,Bean properties ,Bean naming conventions ,Beans vs. other Java executables ,Events ,Defining your own events XML - XML Syntax, Elements ,Attributes , Comments ,Unicode and Character Sets Character, Entity References. JSP FUNDAMENTALS - Introduction ,Simple JSP Components ,Declarations ,Expressions , Testing the JSP, Scriptlets, XML Notation ,implicit Objects Introduction ,Scope of Variables From JSP to Servlet. SERVLETS - The HTTP protocol ,The request/response paradigm ,HTTP methods Servlet classes, A simple servlet ,Preparing the Servlet ,Creating Your Web Application Starting the server ,Running DataServlet ,Servlet engines , Processing HTML form data with a servlet ,The Servlet Life Cycle JDBC - JDBC versus ODBC,JDBC driver types, JDBC-ODBC bridge, two tier versus three tier models , DriverManager, Driver, Connection,Statement, ResultSet-mapping SQL data types, Review of other Java technologies Java Naming and Directory Interface (JNDI),Java Transaction Service (JTS) Java Message Service (JMS),Java in small memory spaces, eg PDAs Distributed computingoverview of current technologies (J2EE, RMI, CORBA, DCOM) , RMI and ORBs patterns for distributed components ,defining interfaces to active objects problems of building enterprise applications,adopting existing legacy applications into the universal C/S,structure,remote RMI interfaces,RMI clients

### **Text Books:**

The Complete Reference JAVA 2 , Herbert Schildt, TMH

The Complete Guide to JAVA Database Programming, Matthew Siple, TMH

### **References:**

J2EE professional project by pallavi jain and siddiqui (NIIT)

## **Elective-2**

**Name of the Course** : Grid Computing.  
**MCA Trimester-VII** : MC41, Credit: 3, Full

### **Course Objective:**

Grid Computing is a core area of technology which has lot of relevance in various areas. This Course will help the student in understanding Grid Computing, its advantages & various algorithms & security concerns involved. This can also be useful to student for further research in this area.

### **Course Contents:**

Cluster to grid computing, grid models, mobile grid models applications: Values (needs) of Grid Computing, Definitions of Grid Computing and its Taxonomy, Overview of Grid Computing Technology

Anonymous remote computing model: Issues in parallel computing on interconnected network, existing distributed computing approach, ARC model of computation ,two tier Arc language constructs ,Classifications of Grids

The Open Grid Services Architecture (OGSA),Creating and Managing Grid Services,Desktop Supercomputing—Native Programming for Grids,Web Services and Utility Computing,Grid-Enabling Software Applications

Application Integration, Grid-Enabling Network Services, Management of Grid Environments, Grid-enhanced Applications in Research and Industry, Grids in Sciences  
Grids in Industries.

Sneha samuham:Grid computing model,design and implementation of the model, Parallel simulated Annealing Algorithms , simulated annealing technique, clustering algorithm for simulated annealing  
Services and Protocols: Scheduling and Resource Management, Security, Data Handling, Quality of Service, Monitoring, Information Services, Open Grid Services Architecture

### **Text book:**

Grid Computing by D Janakiram

### **References:**

Grid Computing: Making The Global Infrastructure a Reality (Hardcover)

The Grid: Core Technologies by Maozhen Li, Mark Baker

Grid Computing:The Savvy Manager's Guide by awel Plaszczak and Rich Wellner

## **Elective-2**

**Name of the Course** : Mobile Computing.  
**MCA Trimester-VII** : MC41, Credit: 3, Full

### **Course Objective:**

Mobile has become an essential part of present generation. This also provides an tremendous boost to the Mobile Services & Technology market. This course is intended to give the student complete knowledge about this technology & also the various scripting languages like WML etc.

### **Course Contents:**

Introduction: Applications, A short history of wireless communication Telecommunication Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, Security, New data services; DECT: System architecture, Protocol architecture; TETRA, UMTS and IMT-2000: UMTS Basic architecture, UTRA FDD mode, UTRA TDD mode

Satellite Systems: History, Applications, Basics: GEO, LEO, MEO; Routing, Localization, Handover, Examples

Broadcast Systems: Overview, Cyclic repetition of data, Digital audio broadcasting: Multimedia object transfer protocol; Digital video broadcasting

Mobile Network Layer: Mobile IP: Goals, assumptions and requirements, Entities and Terminology, IP packet delivery, Agent advertisement and discovery, Registration, Tunneling and Encapsulation , Optimizations, Reverse tunneling, Ipv6; Dynamic host configuration protocol, Ad hoc networks: Routing, Destination sequence distance vector, Dynamic source routing, Hierarchical algorithms, Alternative metrics

Mobile Transport Layer: Traditional TCP: Congestion control, Slow start, Fast retransmit/fast recovery, Implications on mobility; Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP

Support for Mobility: File systems: Consistency, Examples; World Wide Web: Hypertext transfer protocol, Hypertext markup language, Some approaches that might help wireless access, System architectures; Wireless application protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML script, Wireless telephony application, Examples Stacks with Wap, Mobile databases, Mobile agents

### **Text Books:**

1. Jochen Schiller-Mobile communications, Addison wisely , Pearson Education
2. Wiiliam Stallings-Wireless Communications and Networks

### **Reference Books :**

1. Rappaort-Wireless Communications Principals and Practices
2. YI Bing Lin -Wireless and Mobile Network Architectures, John Wiley

3. P. Nicopolitidis -Wireless Networks, John Wiley
4. K Pahlavan, P. Krishnamurthy -Principles of Wireless Networks
5. M. Richharia -Mobile Satellite Communication: Principles and Trends, Pearson Education

### **Elective-2**

**Name of the Course** : **Artificial Intelligence, Expert System and Neural Networks**

**MCA Trimester - VII** : **MC41, Credit: 3, Full**

**Course Objective:**

To introduce the basic concepts of Artificial Intelligence so that students can apply the knowledge in AI specific products.

**Course Content:**

Problems and Problem Spaces - Defining the Problem as State Space Search, Problem Characteristics, Heuristic Search Techniques – Generate and Test, Hill Climbing, Best-First Search, Problem Reduction; Knowledge Representation - Representation and Mappings, Representing Simple Facts in Predicate Logic, Isa Relationship, Logic Programming; Natural Language Processing and Game Playing - Introduction, Syntactical Processing, Semantic Analysis and Game playing; Expert Systems - Expert System Shells, Knowledge Acquisition; Neural Networks - Learning in Neural Networks, Hopfield Networks, Application of Neural Networks, Back Propagation Algorithm.

**Course Book:**

1. Artificial Intelligence by Rich and Knight

**References :**

1. Artificial Intelligence by Russell & Norwig

## Trimester-VIII

**Name of the Course : Seminar on Contemporary Issues in IT**  
**MCA Trimester - VIII : MC42, Credit: 3, Full**

In order to keep pace with the latest trends, each and every student is expected to exhibit his/her talents by delivering a seminar on contemporary issues in Information Technology.

The Students are advised to collect the material in accordance with the topic of their own choice and they have to prepare a well formatted report and present it before the panel of judges.

**Name of the Course : Industrial Project**  
**MCA Trimester - VIII & IX : MC43, Credit: 9, Full**

### INSTRUCTIONAL NOTES

Students are assigned one or more system development projects. The projects involve part or all of the system development cycle. Students work in teams to acquire practical the behavioral considerations in systems development.

Students will be assigned project guides who will guide them for the trimester.

Projects should be completed and documented in the given time period.

Objectives:

The objective of the project is to help the student develop the ability to apply theoretical and practical tools / techniques to solve real life problems related to industry, academic institutions and research laboratories. After the completion of this project work, the student should be able to:

- Describe the Systems Development Life Cycle (SDLC).
- Evaluate systems requirements.
- Complete a problem definition.
- Evaluate a problem definition.
- Determine how to collect information to determine requirements.
- Perform and evaluate feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and Operational feasibility for the project.
- Work on data collection methods for fact finding.
- Construct and evaluate data flow diagrams.
- Construct and evaluate data dictionaries.
- Evaluate methods of process description to include structured English, decision tables and decision trees.
- Evaluate alternative tools for the analysis process.
- Create and evaluate such alternative graphical tools as systems flow charts and state transition diagrams.
- Decide the S/W requirement specifications and H/W requirement specifications.
- Plan the systems design phase of the SDLC.
- Distinguish between logical and physical design requirements.
- Design and evaluate system outputs.
- Design and evaluate systems inputs.
- Design and evaluate validity checks for input data.
- Design and evaluate user interfaces for input.
- Design and evaluate file structures to include the use of indexes.
- Estimate storage requirements.

- Explain the various file update processes based on the standard file organizations.
- Decide various data structures.
- Construct and evaluate entity-relationship (ER) diagrams for RDBMS related projects.
- Perform normalization for the unnormalized tables for RDBMS related projects
- Decide the various processing systems to include distributed, client/server, online and others.
- Perform project cost estimates using various techniques.
- Schedule projects using both GANTT and PERT charts.
- Perform coding for the project.
- Documentation requirements and prepare and evaluate systems documentation.
- Perform various systems testing techniques/strategies to include the phases of testing.
- Systems implementation and its key problems.
- Generate various reports.
- Be able to prepare and evaluate a final report.
- Brief the maintenance procedures and the role of configuration management in operations.
- To decide the future scope and further enhancement of the system.
- Plan for several appendices to be placed in support with the project report documentation.
- Work effectively as an individual or as a team member to produce correct, efficient, well-organized and documented programs in a reasonable time .
- Recognize problems that are amenable to computer solutions, and knowledge of the tools necessary for solving such problems.
- Develop of the ability to assess the implications of work performed.
- Get good exposure and command in one or more application areas and on the software
- Develop quality software using the software engineering principles.