MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

पाठ्यक्रम

SYLLABUS

SCHEME OF EXAMINATION AND COURSES OF STUDY

FACULTY OF SCIENCE

Master of Computer Application

Semester I, II (w.e.f. 2010-11)

Semester III, IV (w.e.f. 2011-12)

Semester V, VI (w.e.f. 2011-12)

सत्र 2013–14

महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

NOTICE

1. Change in Statutes/Ordinances/Rules/Regulations/ Syllabus and Books may, from time to time, be made by amendment or remaking, and a candidate shall, except in so far as the University determines otherwise comply with any change that applies to years he has not completed at the time of change.**The decision taken by the Academic Council shall be final.**

सूचना

1. समय-समय पर संशोधन या पुन: निर्माण कर परिनियमों /अध्यादेशों / नियमों / विनियमों / पाठ्यक्रमों व पुस्तकों में परिवर्तन किया जा सकता है, तथा किसी भी परिवर्तन को छात्र को मानना होगा बशर्ते कि विश्वविद्यालय ने अन्यथा प्रकार से उनको छूट न दी हो और छात्र ने उस परिवर्तन के पूर्व वर्ष पाठ्यक्रम को पूरा न किया हो। **विद्या परिषद द्वारा लिये गये निर्णय अन्तिम होंगे।**

TEACHING AND EXAMINATION SCHEME FOR MASTER OF COMPUTER APPLICATIONS

SEMESTER – V

Paper Name (Theory)	Lec	Tut	Exam Hours	Max Marks	
				Sess Marks	Sem Exam
Cloud Computing	5	1	3	20	80
Advance Java	5	1	3	20	80
Advance Web Programming	5	1	3	20	80
Elective I					
1.1 Information Security	5	1	3	20	80
1.2 Soft Computing					
Elective II					
2.1 Spatial Database Management System	5	1	3	20	80
2.2 Grid Computing					
Total of Theory					**500**

Paper Name (Practical)	Pract Hours	Exam. Hours	Max Marks
Minor Project	4	3	50
Elective I Lab	4	3	50
Elective II Lab	4	3	50
Window Programming Lab	4	3	50
Total of Practical			200
Grand Total (Theory + Practical)			**700**

SEMESTER – VI

Paper Name (Theory)	Lec / Prac	Exam Hours	Max Marks	
			Sess Marks	Sem Exam Marks
Dissertation	30	3	60	240
Seminar	12	3	20	80
Total of Theory				**400**

Note:

Part A:

1. 10 Question of 1 mark each – 10 marks
2. Answer should not exceed more than 20 words
3. All questions are compulsory

Part B:

1. 5 Questions of 2 marks each – 10 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part C:

1. 3 Questions of 20 marks each – 60 marks.
   There will be an internal choice in each question.
2. Answer should not exceed 400 words
3. All questions are compulsory.
   Two Practical exams shall be conducted by one internal and one external examiner of a batch of 30 students in day.
   Duration of Practical exam is 3 hours.
   A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.
   Practical of 50 marks distribution is as under:
   a. 30 marks for practical examination exercise for 3 questions
   b. 10 marks for Viva-voce
   c. 10 marks for Laboratory Exercise File
   Eligibility : BCA/BSC (CS/IT)/BSC/Graduate from any discipline with Maths as one of the subjects with at least 50% marks in aggregate.
   Admission strictly on the basis of merit in the Entrance Test based on Computer Application and rasoning ability.

Scheme of Examination

(For M. C. A.)

Reg. 17 (b)

The examination for the Master of Computer Applications will consist of 6 semesters. The examination shall consist of (a) Theory papers (b) Laboratory / Practical work (c) seminar (d) minor project and (e) industrial dissertation work. Candidates will be required to pursue a regular, full time course of study at the University department for a period of three academic years in order to be eligible for appearing in the examination.

1. Eligibility for M. C. A.: BCA/BSC (CS/IT)/BSC/Graduate from any discipline with Maths as one of the subjects with at least 50% marks in aggregate.
2. Examination:
   i. There shall be 47 papers (5 theory, 4 practical in each semester and 1 minor project in V Semester and 1 industrial dissertation and seminar in VI Semester) of 3900 marks (I to VI Semester). There will be 1 Elective in IV Semester and 2 Electives in V Semester. Theory paper shall be of 3 hours duration having 100 marks. Out of 100 marks 20 marks shall be considered as internal assessment based on internal test and seminars and 80 marks will be of examination at the end of each semester as determined by the University. The practical shall be of 50 marks assessed by external examiner. The Minor Project work shall be of 50 marks based on project presentation and viva-voce, assessed by external examiner. The Seminar in VI Semester will be 100 marks based on presentation and viva-voce assessed by external examiner. The Industrial Dissertation shall be 300 marks based on project presentation and viva-voce, assessed by external examiner.

   ii. To pass a semester a candidate shall have to score 40% marks in each subject (theory and practical) separately and also 50% marks in aggregate of all the papers prescribed for the examination.
   iii. Due paper(s) will be applicable if a candidate obtains 50% marks in aggregate and fails in not more than two (2) papers (theory). Due paper(s) of I semester will be held along with the III semester, the due of III semester will be held along with V semester, the due paper(s) of II semester will be held along with the IV semester and due papers of the IV semester will be held along with the VI semester. The V and VI semester due paper(s) will be held in the I and II semester respectively of the next year. The chance of due paper(s) will be given only once in each semester.
   iv. Wherever a candidate appears at for a due paper examination he/she will do so according to the syllabus in force.
   v. A candidate not appearing at any examination/absent in any paper of term end examination shall be deemed as fail.

A candidate for a pass in the examination shall be required to obtain:

i. At least 50% marks in the aggregate of all the papers prescribed for the examination and
ii. At least 50% marks in the practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure at least 40% marks in each individual paper at the examination notwithstanding his/her having obtained the minimum percentage of marks required in the aggregate for that examination.

No Division will be awarded in the first, to fifth semester examinations. Division shall be awarded at the end of the sixth semester Examination on the combined marks obtained at the first to fifth semester taken together as noted below:

Passed with First Division	60% of the aggregate marks taken together of all the Six semester examinations
Passed with second division	48%

All the rest will be declared to have passed the examination.

Provided that if a candidate clears any paper after a continuous period of three years since he/she was admitted to the M. C. A. then for the passing marks, i.e. 40% marks, shall be taken into account in the case of such course(s).

Provided further that in case where a candidate requires more than 40% marks in order to reach the requisite minimum aggregate i.e. 50% marks, as many marks, out of those actually secured by him/her will be taken into account as would enable him/her to make up the deficiency in the requisite minimum aggregate marks.

4. The grace marks shall be given up to 1% of the total aggregate marks of theory and practical of that semester in maximum one paper.
5. Candidates reappearing at an examination in a subsequent year shall be examined in accordance with the scheme and syllabi in force and shall be entitled to the award of the degree of year in which they clear the last failing/unclear paper.

SEMESTER – V

Duration 3 hours *Max marks 80*

MCA – 501 CLOUD COMPUTING

Cloud Computing Introduction, From, Collaboration to cloud, working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping schedules managing projects, presenting on road.

Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets, and databases.

Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis Understanding cloud storage, evaluating on line file storage, exploring on line

book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.

Duration 3 hours *Max marks 80*

MCA – 502 ADVANCE JAVA

JAVA fundamentals, Java I/O streaming, filter and pipe streams, Byte Code interpretation reflection, Dynamic Reflexive Classes, Threading, Java Native Interfaces, Swing

Network programming in JAVA, Sockets, secure sockets, custom sockets, UDP

datagrams, multicast, sockets, URL classes, Reading Data from the server, writing data, configuring the connection, Reading the header, telnet application, Java Messaging services

Applications in distributed environment, Remote method Invocation, activation models, RMI custom sockets, Object Serialization, RMI, IIOP implementation, CORBA, IDL technology, Naming Services, CORBA programming Models, JAR file creation

Multi-tier application development, Server side programming, servlets, Java Server Pages, Applet to Applet communication, applet to Servlet communication, JDBC, Using BLOB and

CLOB objects, storing Multimedia data into databases, Multimedia streaming, applications, Java Media Framework

Enterprise Applications, Server Side Component Architecture, Introduction to J2EE, Session Beans, Entity Beans, Persistent Entity Beans, Transactions.

Reference:

1. Jim Farley, William Crawford, O'Reilly and Associates, "Java Enterprise in a Nutshell", 2005.
2. Brett McLaughlin, O'Reilly, "Java and XML, 2nd Edition, 2001.
3. Elliott Rusty Harold and W. Scott Means, O'Reilly, "XML in a Nutshell", 2001.
4. James Cooper, "Java Design Pattern: A Tutorial", Addison Wesley.
5. Govind Sesadri, "Enterprise java Computing: Application and Architectures", Cambridge University Publications, 1999.

Duration 3 hours *Max marks 80*

MCA – 503 ADVANCE WEB PROGRAMMING

Introduction to .NET Framework: Genesis of .Net – Features of .Net - .Net binaries – Microsoft Intermediate Language – Meta Data - .Net types and .net name spaces – Common Language Runtime – Common Type System – Common Language Specification - .Net Applications using command line compiler and visual studio .net IDE.

Basics of ASP.NET: Introducing ASP .NET – Creating and deploying ASP .NET applications – Web forms – Web controls – working with events – Rich web controls – Custom web controls – Validation controls – Debugging ASP .NET pages.

Advanced ASP .NET: ASP .NET configuration – Business objects – HTTP Handlers – Caching in ASP .NET – ASP .NET security – Localizing ASP .NET applications – Deployment projects Building Web Services: Introduction to web services – Web services Infrastructure – SOAP – Building a web service – Deploying and publishing web services – Finding web services – Consuming web services

ADO.NET: Basics of ADO.NET – Changes from ADO – Data Table – Data Views – Data Set – Data Relation Type – ADO.NET Managed Providers – OLEDB and SQL Managed Providers – OLEDB Data Adapter Type.

Duration 3 hours *Max marks 80*

Elective I

MCA – 504a INFORMATION SECURITY

Introduction to Cryptography: Introduction To Security: Attacks, Services & Mechanisms, Security, Attacks, Security Services

Conventional Encryption: Classical Techniques, Conventional Encryption Model, and Steganography, Classical Encryption Techniques.

Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operation.

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, RC2 Placement & Encryption Function, Key Distribution, Random Number Generation, Placement of Encryption Function.

Public Key Encryption: Public-Key Cryptography: Principles of Public-Key Cryptosystems, RSA Algorithm, Key Management, Fermat's & Euler's Theorem, Primality, The Chinese Remainder Theorem.

Hash Functions: Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm, (SHA), Digital Signatures: Digital Signatures, Authentication Protocol, Digital Signature Standard (DSS), Proof Of Digital Signature Algorithm. Network & System Security: Authentication Applications: Kerberos X.509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S / Mime, Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management, Web Security: Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set), System Security: Intruders, Viruses, Firewall Design Principles, Trusted Systems.

Reference:

1. Intrusion Detection & Prevention by Carl Endorf, Eugene Schultz, Jim Mellander,
   Jack Kozio. Mcgraw Hill publication
2. Network Intrusion Detection (3Edition) by Stephen Northcutt and Judy Novak
3. Snort 2.1 Intrusion Detection (Book with CD-ROM) by Jay Beale, Caswell Syngress

4. William Stallings; Cryptography and Network Security, Pearson publication, 4 Edition, 2004
5. William Stallings; Network Secuirty Essentials, Pearson publication, 2005.
6. A. Menezes, P. van Oorschot, and S. Vanstone; Handbook of Applied Cryptography, CRC Press, 1996 -www.cacr.math.uwaterloo.ca/hac

Duration 3 hours *Max marks 80*

MCA – 504b SOFT COMPUTING

Basic of neural Networks, inference and learning, classification of models, association of models, optimization and self organization models, definition of learning, supervised and unsupervised learning. AI learning, neural network learning, knowledge based neural network, rule based, decision tree based, constraint based neural network.

Incremental learning, symbolic methods, neural network approaches, applications of neural networks, neural networks as mathematical models, expert system heuristic, hierarchical models, hybrid, parallel, control network discovery, symbolic methods, neural network methods.

Genetic Algorithm, evolutionary programming, classifier system, genetic programming parse tree, mathematical foundation of GA variant of GA (Hybrid and fuzzy GA enhancement of genetic programming application

Duration 3 hours *Max marks 80*

Elective II

MCA – 505a SPATIAL DATABASE MANAGEMENT SYSTEM

Introduction to GIS, history, definition, hardware and software, raster based GIS, data acquisition, nature of spatial data, geo-referencing.

GIS functionality, data models, raster, vector, object oriented, coordinate system and geo-coding, data structures

Introduction to ArcView, creating maps, adding tabular data, choosing map projection, attribute features, aggregating data, creating and editing spatial data.

Introduction to VBA / .NET, data types, string, numbers, geo-coding, script writing, loops, interacting with views and themes, graphics, creating layout.

Spatial data overview, data mining primitives, generalization and specialization, spatial rules, classification algorithms, classification, clustering algorithms.

Duration 3 hours *Max marks 80*

Elective II

MCA – 505b GRID COMPUTING

Introduction: Grid Computing & Key Issues – Applications – Other Approaches – Grid Computing Standards – Pragmatic Course of Investigation.

Grid Benefits & Status of Technology: Motivations – History of Computing,

Communications and Grid Computing – Grid Computing Prime Time – Suppliers and Vendors – Economic Value – Challenges.
Components of Grid Computing Systems and Architectures: Basic Constituent Elements-A Functional View – A Physical View – Service View.
Grid Computing Standards-OGSI: Standardization – Architectural Constructs – Practical View – OGSA/OGSI Service Elements and Layered Model – More Detailed View.
Standards Supporting Grid Computing-OGSA: Functionality Requirements – OGSA Service Taxonomy – Service Relationships – OGSA Services – Security Considerations.

References:

1. A Networking Approach to Grid Computing, Daniel Minoli, Wiley Publication
2. Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson/PHI PTR-2003
3. Grid Computing – A Practical Guide to Technology and Applications, Ahmar Abbas, Charles River Media Publication.

SEMESTER – VI

There will be sessional (internal assessment) of 20 marks conducted by the department.
Seminar shall be conducted by one internal and one external examiner of a batch of 20 students in a day.
Dissertation shall be conducted by one internal and one external examiner of a batch of 20 students in a day.

MANUAL FOR PREPARATION OF THESIS

1. GENERAL

The manual is intended to provide broad guidelines to the MCA candidates in the preparation of the thesis. In general, the thesis shall report, in an organized and scholarly fashion, an account of original research work of the candidate leading to the discovery of new facts or techniques or correlation of facts already known (analytical, experimental, hardware oriented, etc.)

2. NUMBER OF COPIES TO BE PREPARED

At least four copies are to be prepared, one each for External Examiner, Guide, Departmental Library and self. The copies should be submitted to the Head of the Department before the due date.

3. ARRANGEMENT OF CONTENTS OF THESIS

The sequence in which the thesis material should be arranged and bound should be as follows:

1. Title page
2. Bonafide Certificate

3. Abstract
4. Acknowledgement
5. Table of Contents
6. List of Tables
7. List of Figures
8. List of Symbols, Abbreviations or Nomenclature (Optional)
9. Chapters
10. References
11. Appendices

The Tables and Figures shall be introduced in the appropriate places.

4. PAGE DIMENSIONS AND MARGIN

The thesis should be prepared on good quality white paper preferably not lower than 80gsm. Standard A4 size paper should be used for preparing the copies. The final thesis should have the following page margins:

Top edge	: 30 to 35 mm
Left side	: 35 to 40 mm
Bottom edge	: 25 to 30 mm
Right side	: 20 to 25 mm

Tables and figures should conform to the margin specifications. Large size figures should be photographically or otherwise reduced to the appropriate size before insertion.

5. MANUSCRIPT PREPARATION

The headings of all items 2 to 11 listed in section 3 should be typed in capital letters without punctuation and centered 50mm below the top of the page. The text should commence 4 spaces below this heading.

5.1 Title Page – A specimen copy of the title page is given in Appendix 1.

5.2 Bonafide Certificate – A specimen copy of the bonafide certificate is given in Appendix 2.

5.3 Abstract – Abstract should be an essay type of narrative not exceeding 600 words, outlining the problem, the methodology used for tackling it and a summary of the findings.

5.4 Acknowledgement – It should be brief and preferably should not exceed one page when typed double spacing.

5.5 Table of Contents – The table of contents should list all material following it as well as any material which precedes it. The title page, bonafide certificate and acknowledgement will not find a place among the items listed in the table of contents. One and a half spacing should be adopted for typing the matter under this head.

5.6 List of Tables – The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.

5.7 List of Figures – The list should use exactly the same captions as they

appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head.

5.8 List of Symbols, Abbreviations and Nomenclature – One and a half spacing should be adopted for typing the matter under this head. Standard symbols and abbreviations should be used.

5.9 Chapters – The chapters may be broadly divided into 3 parts

(i) Introductory chapter,

(ii) Chapters developing the main theme of the thesis,

(iii) Results, Discussions and Conclusions.

The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

* Each chapter should be given an appropriate title.
* Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
* Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page which refers to the material they annotate.

5.10 List of References – When works of other researchers are used either directly or indirectly the origin of the material thus referred to at appropriate places in the thesis should be indicated. A paper, a monograph or a book may be designated by the name of the first author followed by the year of publication, placed inside brackets at the appropriate place of reference. The citation may assume any one of the following forms.

Examples of citation

(i) An improved algorithm has been adopted in literature (Tsychiya 1980)

(ii) Jankins and Walts (1968) have dealt at length with this principle.

(iii) The problem of mechanical manipulators has been studied by Shin et al (1984) and certain limitations of the method used has been pointed out by Shin et al (1984 a).

The listing should be typed 4 spaces below the heading REFERENCES in alphabetical order in single spacing left-justified. The reference material should be listed in the alphabetical order of the first author. The name(s) of the author(s) should be immediately followed by the year and other details.

A typical illustrative list is given below.

REFERENCES

1. Ariponnammal S. and Natarajan S. (1994) 'Transport Phonomena of Sm Sel-x Asx', Pramana Journal of Physics, Vol. 42, No.5, pp.421-425.
2. Barnard R.W. and Kellogg C. (1980) 'Applications of Convolution Operators to Problems in Univalent Function Theory', Michigan Mach. J., Vol 27, pp 81-94.
3. Jankins G.M. and Walts D.G. (1968) 'Spectral Analysis and its Applications', Holder Day, San Francisco.
4. Shin K.G. and McKay N.D. (1984) 'Open Loop Minimum Time Control of Mechanical Manipulations and its Applications', Proc. Amer. Contr. Conf., San Diego, CA, pp.1231-1236.

5.11 Appendices – Appendices are provided to give supplementary information, which if included in the main text may serve as a distraction and cloud the central theme under discussion.

* Appendices should be numbered using Arabic numerals, e.g. appendix 1, Appendix 2, etc.
* Appendices, tables and references appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.

5.12 Tables and Figures – The word table means tabulated data in the body of the thesis as well as in the appendices. All other material used in the body of the thesis and appendices such as charts, graphs, maps, photographs and diagrams may be designated as figures.

* A table or figure including caption should be accommodated within the prescribed margin limits and appear on the page following the page where their first reference is made.
* Tables and figures half page or less in length may appear on the same page along with the text. However, they should be separated from the text both above and below by triple spacing.
* All tables and figures should be prepared on the same paper or material used for the preparation of the rest of the thesis.
* Two or more small tables or figures may be grouped if necessary in a single page.
* Photographs, if any, should be included in colour xerox form or as colour printouts of scanned images. More than one figure can be included in a page.

6. TYPING INSTRUCTIONS

6.1 General Uniformity of the font (say, Times New Roman) in the entire thesis shall be observed. A sub-heading at the bottom of a page must have atleast two full lines below it or else it should be carried over to the next page. The last word of any page should not be split using a hyphen. Double spacing should be used for typing the bonafide certificate and acknowledgement. One and a half spacing should be used for typing the general text. Single spacing should be used for typing:

(i) Long Tables

(ii) Long quotations

(iii) Foot notes

(iv) Multiline captions

(v) References All quotations exceeding one line should be typed in an indented space - the indentation being 15mm from either margins.

6.2. Chapters:

The format for typing chapter headings, divisions headings and sub division headings are explained through the following illustrative examples. Chapter heading: CHAPTER 1
INTRODUCTION Division heading : 1.1 OUTLINE OF THESIS
Sub-division heading: 1.1.2. Literature review The word CHAPTER without punctuation should be centered 50mm down from the top of the page. Two lines below, the title of the chapter should be typed centrally in capital letters. The text should commence 4 lines below this title. The division and sub-division captions along with their numberings should be left-justified. The typed material directly below division or sub-division heading should commence 2 spaces below it. Within a division or sub-division paragraphs are permitted. Every paragraph should commence 3 spaces below the last line of the preceding paragraph.

7. NUMBERING INSTRUCTIONS

7.1 Page Numbering

All page numbers (whether Roman or Arabic) should be typed without punctuation on the upper right hand corner 20mm from top with the last digit in line with the right hand margin. The preliminary pages of the thesis (such as title page, acknowledgement, table of contents, etc.) should be numbered in lower case Roman numerals. The title page will be numbered as (i) but this should not be typed. The page immediately following the title page shall be numbered (ii) and it should appear at the top right hand corner as already specified. Pages of main text, starting with Chapter 1 should be consecutively numbered using Arabic numerals.

7.2 Numbering of Chapters, Divisions and Sub-Divisions The numbering of chapters, divisions and sub-divisions should be done using Arabic numerals only and decimal notation should be used for numbering the divisions and sub-divisions within a chapter. For example, sub-division 4 under division 3 belonging to Chapter 2 should be numbered as 2.3.4. The caption for the sub-division should immediately follow the number assigned to it. Every chapter beginning with the first chapter should be serially numbered using Arabic numerals.

7.3 Numbering of Tables and Figures Tables and figures appearing anywhere in the thesis should bear appropriate numbers. The rule for assigning such numbers is illustrated through an example. Thus, if a figure in Chapter 3, happens to be the fourth then assign Fig. 3.4 to that figure. Identical rules apply for tables except that the word Fig. is replaced by the word Table. If figures (or tables) appear in appendices then figure 3 in Appendix 2 will be designated as Fig. A2.3. A table may be continued

into the next page, but no line should be drawn underneath an unfinished table. The top line of the table continued into the next page should, for example, read Table 2.1 (continued) placed centrally and underlined.

7.4 Numbering of Equations

Equations appearing in each chapter or appendix should be numbered serially, the numbering commencing afresh for each chapter or appendix. Thus, for example, an equation appearing in Chapter 2, if it happens to be the eighth equation in that chapter should be numbered (2.8) thus: ... (2.8) While referring to this equation in the body of the thesis it should be referred to as Eqn. 2.8.

8. BINDING SPECIFICATIONS

The thesis should be bound using flexible cover of thick blue art paper. The cover should be printed in black letters and the text for printing should be identical to what has been prescribed for the title page.

* * * * *

TEACHING AND EXAMINATION SCHEME FOR MASTER OF COMPUTER APPLICATION

SEMESTER – I

Paper Name (Theory)	Lec	Tut	Exam Hours	Min Marks	Max Marks
Computer Organization	5	1	3	20	80
Introduction to Programming	5	1	3	20	80
Open Source Technology	5	1	3	20	80
Computer Networks	5	1	3	20	80
Database Management Systems	5	1	3	20	80
Total of Theory					**500**

Paper Name (Practical)	Pract Hours	Pact Exam	Max Marks
'C' Programming Lab	4	3	50
PC Software, Networking Lab	4	3	50
Microprocessor ,DBMS Lab	4	3	50
Open source Lab	4	3	50
Total of Practical			200
Grand Total (Theory + Practical)			**700**

SEMESTER – II

Paper Name (Theory)	Lec	Tut	Exam Hours	Min Marks	Max Marks
Computer Oriented Numerical Methods	5	1	3	20	80
Data Structures , Algorithm & Analysis	5	1	3	20	80
Operating Systems	5	1	3	20	80
Object Oriented Programming	5	1	3	20	80
Visual Programming	5	1	3	20	80
Total of Theory					**500**

Paper Name (Practical)	Pract Hours	Pact Exam	Max Marks
'C++' Programming and CONM	4	3	50
Data Structures	4	3	50
Operating System Lab	4	3	50
Visual object oriented Programming Lab	4	3	50
Total of Practical			200
Grand Total (Theory + Practical)			700

SEMESTER – III

Paper Name (Theory)	Lec	Tut	Exam Hours	Min Marks	Max Marks
Data Warehouse	5	1	3	20	80
Internet Technology	5	1	3	20	80
Computer Graphics	5	1	3	20	80
Advance Database Management System	5	1	3	20	80
Elective I- - Bluetooth Technology -Wireless Protocols	5	1	3	20	80
Total of Theory (Internal & Main)					**500**

Paper Name (Practical)	Pract Hours	Pact Exam	Max Marks
Internet Technology lab	4	3	50
Computer Graphic lab	4	3	50
ADBMS lab	4	3	50
Networking Lab	4	3	50
Total of Practical			200
Grand Total (Theory + Practical)			**700**

SEMESTER – IV

Paper Name (Theory)	Lec	Tut	Exam Hours	Min Marks	Max Marks
Data Mining	5	1	3	20	80
Advance Internet Technology	5	1	3	20	80
Object Oriented Software Engineering	5	1	3	20	80
Artificial Intelligence	5	1	3	20	80
Elective I 1. Computer Vision & Human Computer Interface 2. Image Processing & Pattern Recognition	5	1	3	20	80
Total of Theory (Internal & Main)					**500**

Paper Name (Practical)	Pract Hours	Exam Hours	Max Marks
AI Lab	4	3	50
Coginative Science Lab	4	3	50
Advance Internet Technology Lab	4	3	50
Data Mining Lab	4	3	50
Total of Practical			200
Grand Total (Theory + Practical)			**700**

Note:

Part A:

1. 10 Question of 1 mark each – 10 marks
2. Answer should not exceed more than 20 words
3. All questions are compulsory

Part B:

1. 5 Questions of 2 marks each – 10 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part C:

1. 3 Questions of 20 marks each – 60 marks.
   There will be an internal choice in each question.
2. Answer should not exceed 400 words
3. All questions are compulsory.

There will be sessional (internal assessment) of 20 marks conducted by the department.

Two Practical exams shall be conducted by one internal and one external examiner of a batch of 30 students in day.

Duration of Practical exam is 3 hours.

A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.

Practical of 50 marks distribution is as under:

a. 30 marks for practical examination exercise for 3 questions
b. 10 marks for Viva-voce
c. 10 marks for Laboratory Exercise File

Eligibility: BCA/BSC (CS/IT)/BSC/Graduate from any discipline with Maths as one of the subjects with at least 50% marks in aggregate. Admission strictly on the basis of merit in the Entrance Test based on Computer Application and reasoning ability.

Scheme of Examination
(For M. C. A.)

Reg. 17 (b)

The examination for the Master of Computer Applications will consist of 6 semesters. The examination shall consist of (a) Theory papers (b) Laboratory / Practical

work (c) seminar (d) minor project and (e) industrial dissertation work. Candidates will be required to pursue a regular, full time course of study at the University department for a period of three academic years in order to be eligible for appearing in the examination.

1. Eligibility for M. C. A.: BCA/BSC(CS/IT)/BSC/Graduate from any discipline with Maths as one of the subjects with at least 50% marks in aggregate.
2. Examination:
   i. There shall be 47 papers (5 theory, 4 practical in each semester and 1 minor project in V Semester and 1 industrial dissertation and seminar in VI Semester) of 4900 marks (I to VI Semester). There will be 1 Elective in IV Semester and 2 Electives in V Semester. Theory paper shall be of 3 hours duration having 100 marks. Out of 100 marks 20 marks shall be considered as internal assessment based on internal test and seminars and 80 marks will be of examination at the end of each semester as determined by the University. The practical shall be of 100 marks assessed by external examiner. The Minor Project work shall be of 100 marks based on project presentation and viva-voce, assessed by external examiner. The Seminar in VI Semester will be 100 marks based on presentation and viva-voce assessed by external examiner. The Industrial Dissertation shall be 300 marks based on project presentation and viva-voce, assessed by external examiner.
   ii. To pass a semester a candidate shall have to score 40% marks in each subject (theory and practical) separately and also 50% marks in aggregate of all the papers prescribed for the examination.
   iii. Due paper(s) will be applicable if a candidate obtains 50% marks in aggregate and fails in not more than two (2) papers (theory). Due paper(s) of I semester will be held along with the III semester, the due of III semester will be held along with V semester, the due paper(s) of II semester will be held along with the IV semester and due papers of the IV semester will be held along with the VI semester. The V and VI semester due paper(s) will be held in the I and II semester respectively of the next year. The chance of due paper(s) will be given only once in each semester.
   iv. Wherever a candidate appears at for a due paper examination he/she will do so according to the syllabus in force.
   v. A candidate not appearing at any examination/absent in any paper of term end examination shall be deemed as fail.
3. A candidate for a pass in the examination shall be required to obtain:
   i. At least 50% marks in the aggregate of all the papers prescribed for the examination and
   ii. At least 50% marks in the practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure at least 40% marks in each individual paper at the examination notwithstanding his/her having obtained the minimum percentage of marks required in the aggregate for that examination.

No Division will be awarded in the first, to fifth semester examinations. Division shall be awarded at the end of the sixth semester Examination on the

combined marks obtained at the first to fifth semester taken together as noted below:

Passed with First Division	60% of the aggregate marks taken together of all the Six semester examinations
Passed with second division	48%

All the rest will be declared to have passed the examination.

Provided that if a candidate clears any paper after a continuous period of three years since he/she was admitted to the M. C. A. then for the passing marks, i.e. 40% marks, shall be taken into account in the case of such course(s).

Provided further that in case where a candidate requires more than 40% marks in order to reach the requisite minimum aggregate i.e. 50% marks, as many marks, out of those actually secured by him/her will be taken into account as would enable him/her to make up the deficiency in the requisite minimum aggregate marks.

4. The grace marks shall be given up to 1% of the total aggregate marks of theory and practical of that semester in maximum one paper.
5. Candidates reappearing at an examination in a subsequent year shall be examined in accordance with the scheme and syllabi in force and shall be entitled to the award of the degree of year in which they clear the last failing/unclear paper.

SEMESTER – I

Duration 3 hours *Max marks 100*

MCA – 101 COMPUTER ARCHITECTURE

Number system, Logic Gates, Boolean Algebra, K-Map, combinational circuit, flip-flop, sequential circuit, encoder, decoder, multiplexer, shift register, fixed-point representation, floating-point representation.

Register transfer language, inter-register transfer, arithmetic micro operation, logic and shift micro operation, instruction codes, timing and control, input/output and interrupts.

Processor bus organization, arithmetic logic unit, stack organization, instruction format, addressing mode, data transfer and manipulation, program control, control memory, addressing sequence, micro program sequencer, micro instruction formats.

Block diagram of 8085 and pin configuration, 8086/8088 instruction set, data transfer instructions, arithmetic, logical, shift, rotate, flag, compare, jump instruction, subroutine, loop, addressing modes, memory hierarchy, associative memory, memory addressing, virtual memory, cache memory, cache coherence.

Reference Books:

1. Computer Architecture and Organization, Hayes, Tata McGraw Hill
2. Computer Architecture and Logic Design, Thomas C, Tata McGraw Hill
3. Computer System Architecture, M. Morris Mano, PHI
4. Digital computer, M. Morris Mano, PHI
5. Computer Architecture, William Sterling

Duration 3 hours *Max marks 80*

MCA – 102 INTRODUCTION TO PROGRAMMING

C Language: Types, Operators and Expressions, variable names, data types and sizes, constants, declarations, operator, expressions and type conversions.

Control flow: Statements and blocks, selection and loops structures, break, continue, branching and labels.

Functions and program structure: Basics, functions and their arguments, external variables and static variables, scope rules, register variables, block structures, initialization, recursion.

Pointers and Arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, multi-dimensional arrays, pointers arrays, pointer to functions, 2D string and string functions.

Structures: Basics, structures and functions, arrays of structures, pointers to structures, table look up fields, typedef, file, stack, single linked list, double linked list, circular linked list, prefix, postfix, infix, queue, d-queue.

Duration 3 hours *Max marks 80*

MCA – 103 OPEN SOURCE TECHNOLOGY

History of Linux, Linux architecture, Linux file System, file naming, types of files, directory command, file command, vi editor, locating files in Linux, filter pipe, shell variables, local and global variables, command substitution, if, while, for, shift, tar, basic networking commands in Linux.

PHP:

PHP Basics, variable data types, arrays, constants, operators, control structures, loops, functions, PHP object oriented language, PHP design patterns, overloading, how to write a web application with PHP, user input, validation, filter error handling, session, cookies, uploading

Duration 3 hours *Max marks 80*

MCA – 104 COMPUTER NETWORKS

Introduction to Data communications and networking, protocols, standards and architecture, topology, transmission mode, OSI model, analog and digital signals, periodic and aperiodic signals, time and frequency domain

Encoding digital to digital conversion, analog to digital conversion, digital to analog conversion, analog to analog conversion, transmission of digital data, DTE-DCE interface, EIA-232, , X.21, modem, cable modem, guided and unguided, transmission media

Multiplexing, TDM, FDM, WDM, DSL, HDLC, Asynchronous transfer mode, protocol architecture, ATM cells, ATM layers, switches, circuit switching network and concepts, routing, packet switching, X.25, virtual circuit approach, point-to-point layers, link control protocol, network control protocol.

Reference:

1. Data and Computer communications, William Stallings, PHI
2. Data communication and networking, Behoruz A. Forouzan
3. Data communication and networking, A S Godbole, Tata McGrawhill
4. Network concepts and Architecture, Hancock, BPB Publications

5. Data Communication and Networking, Tannenbaum, PHI

Duration 3 hours *Max marks 80*

MCA – 105 DATABASE MANAGEMENT SYSTEMS

Information system, classification, conventional file system, object of database systems, data abstraction, data definition language, data manipulation language, database administrator. Database design stages, database model, database system architecture.

Centralized and client/server architecture in DBMS, entity relationship model, entities and entity sets their relationship, mapping constraints, generalization, aggregation, use of ER model for the design of databases, sequential, random, index sequential file organization, introduction and history of relational database, system relational algebra, normalization up to DKNF.

MS Access: create database, table, lookup field, setting a primary key, input mask to field, viewing and navigating and formatting datasheets, sorting and multilevel sorting in a table, filtering records, searching in table. creating relationships between tables.designing and modifying queries. Passing parameter to queries. importing and exporting tables. Designing forms, reports and summary report

Duration 3 hours *Max marks 80*

MCA – 201 COMPUTER ORIENTED NUMERICAL METHODS

Characteristics of Numerical Computation, Approximation, Significant Digit, Errors, Introduction to Matrix, Types of Matrix, Square, Row, Column, Diagonal, Unit, Null, Upper Triangular, Lower Triangular, Symmetric, Skew Symmetric, operation of matrix, trace, transpose, addition, subtraction, multiplication, determinant, inverse, Introduction to Linear Equations,

Bisection method, method of successive approximation, method of false position, Newton's iteration method, Newton Raphson method, Horner's method

Gauss Jordan method, Gauss Elimination method, Iterative methods, Jacobi method of iteration, Gauss Seidel Iteration method

Gregory Newton Forward and Backward interpolation Formula,

Reference Books:

1. Numerical Methods, Dr. V. N. Vedamurthy & Iyengar Vikas Publication
2. Computer Oriented Numerical Methods, V.Rajaraman
3. Computer Oriented Numerical Methods, Iyengar & Iyengar

Duration 3 hours *Max marks 80*

MCA – 202 DATA STRUCTURES & ALGORITHM ANALYSIS

Definitions of Data Structure and Algorithm. – Time and Space complexity-Algorithm notations.

Brute force and greedy algorithms, Divide and Conquer Strategy: Merge sort, quick sort, integer multiplication, matrix multiplication (Strassen's Algorithm),

exponentiation problem, convex hull problem, dynamic programming,

Complexity theory: Decidability of problems: Halting problem, NP-class of problem, P class of problem, NP=P question, Polynomial reduction problem, Cook's theorem, NP hardness and NP completene s.

Control structures- Variables – Data types- Arrays- String processing – Sorting and Searching- Insertion-Selection-Merge- Radix-Binary Search- Linear Search-Hashing

Binary tree- Representation – Traversing – Threaded Binary tree- Binary Search tree- Insertion deletion into a binary search tree- Heap sort

Graph- Representation of Graph- Shortest path – Operation on Graphs-Traversing a Graph- Topological Sorting – Files

Reference Books:

1. Seymour Lipschutz – " Theory and Problem of Data Structures" – 1986
2. Ellis Horowitz & Sartaj Sahani – "Fundamentals of Data Structures in C " – W.H. Freeman and Co. – 1992.(Chapter 10)
3. Mark Allen Weiss – "Data Structures and Analysis in C" - Pearson Education Pubs. – 1996.
4. Aho, Hopcroft, Ullman – "Data Structures and algorithms" – Pearson Education – 1983.
5. Jean Paul Tremblay & Paul Sorenson – "An Introduction to Data Structures with Applications" – TMH – 1984

Duration 3 hours *Max marks 80*

MCA – 203 OPERATING SYSTEMS

Introduction to Operating Systems, goals of OS, operation of OS, resource allocater and related functions, classes of OS, batch processing, multi-processing, time sharing, distributed, real time systems, system calls, system programs, structure of OS, layer design of DOS, Unix, virtual machine OS, kernel based OS, micro-kernel based OS, architecture of Window 2000.

Process concept, interacting process, threads, fundamental of scheduling, scheduling criteria, long medium short term scheduling, scheduling algorithms , structure of concurrent system, critical section, critical region, inter-process communication, monitor and semaphores, implementation and uses.

Logical versus physical address, swapping, contiguous allocation, segmentation, paging, segmentation with paging, kernel memory allocation, page replacement algorithm, virtual memory, virtual memory with paging, demand paging, dead lock, characterization, methods for handling dead locks, prevention, avoidance, thrashing, allocation of frame, virtual memory using segmentation,

Architecture of Distributed system, inter-process communication protocol, network OS, issues in distributed design, issues of distributed file system

Reference books:

1. Advance Unix – A Programmer's Guide, Prata, SAMS
2. Operating System Concepts, Galvin, Addison Wesley
3. Operating Systems, Ritchie, BPB Publications.
4. Unix System V Primer, Prata, BPB Publications

Duration 3 hours *Max marks 80*

MCA – 204 OBJECT ORIENTED PROGRAMMING

Data types, operator, input-output, control statements, loops, arrays, strings and string functions, functions, structure and union, Introduction to OOPS, object oriented analysis and design, class, declaring object, member function, data hiding, parameter passing, friend function and class, empty static, overloading, constructor, type of constructor, destructor, recursive constructor, calling constructor and destructor, overloading unary operator, binary operator with friend function, rule of overloading.

Inheritance, derive and base class, overriding, base and derive constructor, type of inheritance, virtual base class, abstract class, qualifier class and inheritance, pointer, pointer to class, pointer to object, pointer to derived class and base class, pointer to member, pointer to array, accessing private member and direct access to private member, new delete operator, dynamic memory,

Binding in C++, virtual function, rule for virtual function, pointer to derive class object, pure virtual function, constructor and virtual functions, polymorphism, file, file operator and commands, use in C++, templates.

Single linked lists, double linked list, circular list, sparse table, stack, queue, d-queue list, priority queue, graph, prefix, postfix, infix, sorting, insertion, selection, bubble, algorithm of quick, merge

Reference Books:

1. Object Oriented Programming with C++, E. Balagurusamy, Tata McGraw Hill.
2. Data Structures and algorithms in C++, Adam Drozdex, Vikas Publications
3. Understanding Programming an introduction using C++, Scott R Canon, Vikas Publications.
4. OOPS with C++, N P Bhave,
5. OOPS with ANSI C++, A N Kamthane,

Duration 3 hours *Max marks 80*

MCA – 205 VISUAL PROGRAMMING

Introduction to Visual Basic .NET IDE and its features, .NET framework, CLR

Language basics: data type, operators, control statements: branching and looping. NET Controls Forms, text boxes, labels, command button, radio button, option buttons, check boxes, list boxes and combo boxes, introduction to ActiveX controls

Strings and Arrays Working with Arrays, array resizing, System.Array class, manipulation of string, string functions for comparison, concatenation, copy, replace, substring, length

Working with Classes Classes, properties and methods, attaching a class with a form Inheritance: derived from existing classes, overriding methods from base class

Exception Handling Types of errors, structured and unstructured exceptions Tracing Errors: breakpoints, watch, quickWatch, autos, locals, call stack.

Database Access ADO.NET and it's Components, datasets, data adapters, server explorer, binding controls to database

Reference Books:

1. Visual Basic.NET Black Book – Steve Holzn

2. Visual Basic.NET Programming Bible – Bill Evjen
3. Pro ADO.NET with VB.NET – Sahil Mailk and Paul Dickinson

Duration 3 hours *Max marks 80*

MCA – 301 DATA WAREHOUSE

Introduction of data warehousing, basic concepts, data warehousing architecture, data characteristics, Reconciled data layers. Data transformation function, tools to support data reconciliation.

Data Modeling Techniques and Options: Dimensions and Query Hierarchies, Star Schema and Variants, Spatial Data: A Very Special Dimension, Storage Concerns and Planning Physical Database Design, Exploiting Parallel Technology, Indexes

Role of meta data, OLAP tools, Security, Backup and Recovery, Loads, Tuning Loads and Scrubs, data warehouse and web, hardware for data warehouse

Duration 3 hours *Max marks 80*

MCA – 302 INTERNET TECHNOLOGY

Internet – current state, hardware and software requirement, ISP, an internet account, web home page, URL, browser, security on web, searching tools, search engines, FTP, Gopher, Telnet, emails

Introduction to Java, characteristics, Object oriented programming, data types, variables, arrays Control statements: selection, iteration, jump statements, operators

Introduction to classes, class fundamentals, constructor, methods, stack class, inheritance, creating multilevel hierarchy, method over riding

Packages and interfaces, exception handling, multi-threaded programming, I/O applets Java Library, string handling, string comparison, string buffer

JavaScript, comment types, JavaScript reserved words, identifiers, events, primitive data types, escape sequences, data type conversion functions and methods, operators, control structures and statements objects, applet fundamentals, applet life cycle, local and remote applet applications, tags, creating and passing parameters to applets, exception handling.

Reference books:-

1. Introduction to Java Programming, Y. Daniel Liang, PHI.
2. Java Complete Reference, Patrick Naughton, Tata McGraw Hill.
3. The Java Handbook, Patrick Naughton, Tata McGraw Hill.
4. Introduction to Java Programming, E Balaguruswamy, PHI.
5. Programming Java, Decker & Hirshfield, Vikas Publications

Duration 3 hours *Max marks 80*

MCA – 303 COMPUTER GRAPHICS

Interactive graphics, passive graphics, advantage of interactive graphics, classification of application, hardware and software requirement of computer graphics

Point, line, DDA algorithm, Bresenham's line algorithm, circle, circle generating algorithm, midpoint circle algorithm, ellipse generating algorithm, midpoint ellipse algorithm, polynomial and spline curves, parallel curve algorithms, curve function, filled area primitives, line attributes, curve attributes, area fill attributes, clippings, clipping lines.

2D transformation, matrix representation of 2D, composite transformation.

translation, rotation, scaling, general pivot-point rotation, general fix scaling, other transformations, reflection, shear, affine transformations and transformation functions, window-to-view port transformation, clipping operation, point, line, Cohen-Sutherland line clipping, polygon clipping.

3D display method, parallel projection, perspective projection, visible line identification, depth cueing, surface rendering, polygon surface, table, equation, mashes, splines, representation, cubic spline interpolation, Bezeir Curves and surfaces, B-spline and surfaces, Beta-spline, 3D transformation, rotation, scaling, composite transformation, 3D transformation function.

Reference books:

1. Principles of Interactive Computer Graphics, Newman and Sproull, Tata McGraw Hill
2. Computer Graphics, Plastok and Gordon Kalley, McGraw Hill
3. Computer Graphics, Cornel Pokorny, BPB Publications.
4. Computer Graphics, Hern & Becker, Pearson Publication (LPE)

Duration 3 hours *Max marks 80*

MCA – 304 ADVANCE DATABASE MANAGEMENT SYSTEM

Object Oriented modeling, class, different types of attributes, generalization, inheritance, aggregation, encapsulation, complex objects, object definition language, object query language, object technology in RDBMS, primary, secondary, multi-level files, dynamic multi-level index using B & B+ tree,

Distributed database design, architecture of distributed processing system, data communication concept, data placement, placement of DDBMS, and other components, concurrency control techniques, recovery, transaction management, need of recovery, recovery techniques, serializability, two-phase locking.

Query optimization and processing, algorithm for external sorting, select and join, object and set operations, heuristics in query optimization, temporal database concept, multi-media database, Security and integrity of databases, security specifications in SQL, access control, flow control.

SQL*PLUS Data types, Constraints, Operators, DDL, DML, PL/SQL syntax, Data types, PL/SQL functions, Error handling in PL/SQL, package functions, package procedures, Oracle transactions. Stored procedures & functions, creation and execution of procedures

Database Triggers: Introduction, Use & type of database Triggers, Triggers Vs. Declarative Integrity Constraints, BEFORE Vs. AFTER Trigger Combinations, Creating a Trigger, Dropping a Trigger.

Duration 3 hours *Max marks 80*

MCA – 305a BLUETOOTH TECHNOLOGY

Introduction to wireless technologies: WAP services, Serial and Parallel Communication, Asynchronous and synchronous Communication, FDM, TDM, TFM, Spread spectrum technology Introduction to Bluetooth: Specification, Core protocols, Cable replacement protocol

Bluetooth Radio: Type of Antenna, Antenna Parameters, Frequency hoping

Bluetooth Networking: Wireless networking, wireless network types, devices roles and states, adhoc network, scatternet Connection establishment procedure, notable aspects of connection establishment, Mode of connection, Bluetooth security, Security architecture, Security level of services, Profile and usage model: Generic access profile (GAP), SDA, Serial port profile, Secondary Bluetooth profile

Hardware: Bluetooth Implementation, Baseband overview, packet format, Transmission buffers, Protocol Implementation: Link Manager Protocol, Logical Link Control Adaptation Protocol, Host control Interface, Protocol Interaction with layers

Duration 3 hours *Max marks 80*

MCA – 305b WIRELESS PROTOCOLS

Overview of Third Generation (3G) in wireless

Universal Mobile Telecommunication Service (UMTS), UMTS Service and Air interface, 3GPP network architecture, CDMA2000, TD-CDMA and TDSCDMA Technologies.

Evolution of 2.5G

Enhancement over 2G, GPRS and EDGE network services and architectures, traffic dimensioning, CDMA2000 (1XRTT), WAP and SMS, migration path from 2G to 2.5G to 3G

UMTS

UMTS basics, WCDMA interface, UTRAN architecture, establishment of UMTS speech cells, UMTS packet data (R99), high speech packet data handover and UMTS core network evolution

CDMA2000

Radio components, network structure packet data transport flow, radio network (IS-2000, 1XRTT), EVDO.

TD-SCDMA

Architecture and code network, radio network, interface migration technique RAN Traffic planning.

TD-CDMA

Generic TD-CDMA architecture, code networks, radio network, interface migration technique RAN traffic planning

VoIP Technology

Basis of IP transport, VoIP challenge, H-323, session invitation protocol, distributed architecture and media gateway control, VoIP and SS7 VoIP quality of service.

Duration 3 hours *Max marks 80*

MCA – 401 DATA MINING

Introduction to data mining, DM techniques, issues and challenges in Dm, Applications, Association rules, Prior, Partition, Pincer-Search, Dynamic Itemset counting, FP-tree growth, Incremental , Boder Algorithm

Clustering Techniques, portioning, k-Medoid algorithm, Hierarchical, categorical clustering algorithm, Decision tree, best split, splitting indices and criteria, decision tree construction algorithm, CART, ID3, C4.5, CHAID, Decision tree construction with presorting, rain Forest, approximate methods, Boat, Pruning Technique

Data mining using NN, web mining, temporal and spatial data mining.

Duration 3 hours *Max marks 80*

MCA – 402 ADVANCE INTERNET TECHNOLOGY

Role Of XML - XML and The Web - XML Language Basics - SOAP - Web Services - Revolutions Of XML - Service Oriented Architecture (SOA).

XML TECHNOLOGY - XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure.

SOAP, Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

WEB SERVICES: Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services In E-Com - Overview Of .NET And J2EE.

XML Security: Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents – XML in Practice

Duration 3 hours *Max marks 80*

MCA – 403 OBJECT ORIENTED SOFTWARE ENGNEERING

Concepts of Software Engineering, Software Characteristics, components applications, software Metrics and Models; Process and Product Metrics, Size metric, Complexity metric, McCabe's Cyclometic Complexity, Halsted Theory, Function Point Analysis.

System Development Life Cycle (SDLC) Steps, Water fall model, Prototypes, Spiral model. Planning and Software Project: Cost Estimation, Project Scheduling, Quality Assurance Plans, Project Monitoring Plans.

Software Development & Software Design : System design, detailed design, function oriented design, object oriented design user Interface design, Design level metrics: Phases, Process Models, Role of Management, Role of Metrics and Measurement, Software Quality factors,

Coding and Testing: Programming Practices, verification, Monitoring and Control. Testing level metrics Software quality and reliability Clean room approach, software reengineering.

Testing & Reliability: Testing Fundamentals, Test case design, Functional Testing, Structural Testing, Test Plan activities during testing, Unit System , Integration Testing. Concept of Software Reliability, Software Repair and Availability, Reliability Models (JM, GO, MUSA Markov) Limitations of Reliability Models

Object-oriented analysis and design using UML: Types and classes, Object structures, Using use cases to discover types, Invariants and rule sets, Invariants and encapsulation, State models, component designing, The design process, Documenting models, Identifying, objects, Task analysis, Kelly grids, Design patterns for decoupling, Designing components: Components for flexibility, Large-scale connectors,, Object modelling symbols: Action (use case) modelling symbols, Sequence and collaboration diagram symbols, State modelling symbols, Action or activity diagram symbols, Implementation and, component modelling symbols.

Reference:

1. Software Engineering Fundamentals, Ali Behforooz, Oxford University Press.
2. Software Engineering, Pressman, R. S. Pressman & Associates.
3. Software Engineering, Sommerville, Addison Wesley

Duration 3 hours *Max marks 80*

MCA – 404 ARTIFICIAL INTELLIGENCE

Definition of AI, Application of AI, knowledge-based systems, representation of knowledge organization and acquisition of knowledge.

Introduction of prolog, variable, object, domain, clauses, recursion basic list manipulation function, predicates, input, output, local variables, iteration, recursion, arrays, database in prolog, rule order, goal order, cut trial prolog query.

Syntax, semantics of propositional logic, syntax and semantics of FOPL, conversion to clausal form, inference rule, resolution principles, non-deductive inference methods, representation using rules, truth maintenance system, predicate completion and circumscription, modal and temporal logics

Bayesian probabilistic inference, possible word representation, Dempster-Shafer Theory, Ad-Hoc methods,

Duration 3 hours *Max marks 80*

MCA – 405a COMPUTER VISION AND HUMAN COMPUTER INTERFACE

Structure from motion, Triangulation, Two-frame structure from motion, Factorization, Bundle adjustment, Constrained structure and motion, Dense motion estimation, Parametric motion, Spline-based motion , Optical flow, Layered motion, Image stitching, Motion models, Global alignment, Compositing

Stereo correspondence , Sparse correspondence , Dense correspondence, Local methods, Global optimization, Multi-view stereo, 3D reconstruction, Active range finding, Surface representations, Point-based representations, Image-based rendering,

View interpolation, Layered depth images, Light fields and Lumi graphs, Environment mattes, Video-based rendering, Recognition, Object detection, Face recognition, Instance recognition, Category recognition, Context and scene understanding, Recognition databases and test sets

Duration 3 hours *Max marks 80*

MCA – 405b IMAGE PROCESSING AND PATTERN RECOGNITION

Fundamental of Image Processing, Applications of Image Processing, image Formation and representation, sampling and quantization, binary image, 3D images, Image File format, color space transformation, color interpolation, Image enhancement and restoration, ,spatial, histogram, frequency domain, noise modeling, image segmentation,Edge detector, image threshold, waterfall algorithm

Recognition of image pattern, basian decision theory, non-parametric classification, unsupervised classification, clustering, K-mean clustering, texture and shape analysis, grey level matrix, texture classification using fractals, shape analysis.

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