Syllabi & Scheme of Examination

Under Choice Based Credit System

w.e.f Academic Session 2017-18

MASTER OF TECHNOLOGY

COMPUTER SCIENCE AND ENGINEERING

(3rd and 4th Semester)

Department of Computer Science and Applications

Chaudhary Devi Lal University, Sirsa

Department of Computer Science & Applications
Chaudhary Devi Lal University, Sirsa (Haryana)
Scheme of Examination for Master of Technology in Computer Science and Engineering
(M. Tech. CSE)
under Choice Based Credit System

M.Tech-1st First Semester

Paper Code	Nomenclature of Paper	Credit	Int Marks	Ext Marks	Total Marks
MT-FT-11	Advanced Data Structure	4	30	70	100
MT-FT-12	Advanced Algorithmics	4	30	70	100
MT-FT-13	Advanced Computer Architecture	4	30	70	100
MT-FT-14	Advanced Database Systems	4	30	70	100
MT-FT-15	Advanced Software Engineering	4	30	70	100
MT-FT-16	S/W Lab - I Based on MT-FT-11	3	25	50	75
MT-FT-17	S/W Lab - II Based on MT-FT-14	3	25	50	75
MT-FT-18	Seminar	2	50	-	50
	Total	28			700

M.Tech-2nd Semester

Paper Code	Nomenclature of Paper	Credit	Int Marks	Ext Marks	Total Marks
MT-FT-21	Advanced Computer Networks	4	30	70	100
MT-FT-22	Object Oriented Analysis And Design Using UML	4	30	70	100
MT-FT-23	Advanced Operating Systems	4	30	70	100
MT-FT-24	Theory Of Computation	4	30	70	100
MT-FT-25	Elective-I	4	30	70	100
MT-FT-26	S/W Lab – I Based On MT-FT-22	3	25	50	75
MT-FT-27	S/W Lab – II Based On MT-FT-23	3	25	50	75
MT-FT-28	Seminar	2	50	-	50
Total		28			700

ELECTIVE-I

i) INFORMATION SECURITY
ii) SOFT COMPUTING
iii) HIGH PERFORMANCE NETWROKS

Note: During the first 3 semesters (semester I to semester III), students have to earn a total of 11 credits from Open Elective courses offered by various departments of the university. In each of the first three semesters of M.Tech the students will have register for and earn a minimum of 2 credits and a maximum of 6 credits.

Total Course Credits	-	113
Total Core Courses Credits	-	81
Total Elective Courses Credits	-	32
Open Elective Course Credits	-	11

4/7/2017

4/7/17

M.Tech-3rd Semester

Paper Code	Nomenclature of Paper	Credit	Int Marks	Ext Marks	Total Marks
MT-FT-31	Research Methodology	4	30	70	100
MT-FT-32	Compiler Design	4	30	70	100
MT-FT-33	Programming with MATLAB	4	30	70	100
MT-FT-34	Elective-I	4	30	70	100
MT-FT-35	Elective-II	4	30	70	100
MT-FT-36	S/W Lab I Based on MT-FT-31	3	25	50	75
MT-FT-37	S/W Lab II Based on MT-FT-33	3	25	50	75
MT-FT-38	Seminar	4	100	-	100
	Total	30			750

Elective-I

1) Web Technology
2) System Simulation and Modeling
3) Advancements in Computing

Elective-II

1) Software Project Management
2) ICT and its Application
3) Data Mining and Data Warehouse

M.Tech-4th Semester

MT-FT-41	Dissertation	L/T 02	P	Credit 27	Int. Ext. - Grade

4/7/17

4/7/2017

MT-FT-31 RESEARCH METHODOLOGY

L/T	P	Credit	Int	Ext
4	-	4	30	70

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UNIT – I

Objectives and types of Research: Motivation and Objectives- Research Methods vs. Methodology, Types of Research- Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical.

Research Formulation: Defining and formulating the research problem- Selecting the problem, necessity of defining the problem, Importance of Literature Review in defining a problem, literature review- Primary and secondary source reviews, Hypothesis- Definition, Qualities of a good hypothesis, null hypothesis and alternatives.

UNIT – II

Research design and methods: Basic principles, Need of research design- features of good design, Important concepts relating to research design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, How to Select a Random Sample?, Random Sample from an Infinite Universe, Complex Random Sampling Designs, Measurement: Concept of measurement, Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio.

UNIT – III

Data Collection and Analysis: Execution of the research, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies, data analysis with statistical packages, hypothesis testing, generalization and Interpretation, Univariate Analysis (frequency tables, bar charts, pie charts, percentages).

UNIT – IV

Meaning of Interpretation, Why Interpretation?, Technique of Interpretation, Precaution in Interpretation

Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

Reports and Thesis Writing: Structure and components of scientific reports, Types of report-Technical reports and thesis, Writing – synopsis, abstract, introduction, review of literature, illustrations and tables, results, summary, reference citing and listing.

References:

1. Garg, B.L., Karadia, R., Aggarwal, F. and Aggarwal, U.K., 2002. An Introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
3. Donald Cooper & Pamela Schindler, Business Research Methods, McGraw Hill.
4. Alan Bryman & Emma Bell, Business Research Methods, Oxford University Press.
5. N. Gurumani, Scientific Thesis Writing and Paper Presentation, MJP Publishers.
6. Montgomery, Douglas C., Design and Analysis of Experiments, Wiley India Pvt. Ltd.

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MT-FT-32 COMPILER DESIGN

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Unit–I.

Introduction To Compilers: Compilers and translators, need of translators, structure of compiler , its different phases, Compiler construction tools. Lexical Analysis: Role of lexical analyzer, design of lexical analyzer, regular expressions , Specification and recognition of tokens, input buffering, A language specifying lexical analyzer. Implementation of lexical analyzer.

Unit–II.

Syntax Analysis: Role of parsers, context free grammars, definition of parsing. Parsing Technique: Shift- reduce parsing, operator precedence parsing, top down parsing, predictive parsing.

Unit-III.

Syntax Directed Translations: Syntax directed definition, construction of syntax trees, syntax directed translation scheme, implementation of syntax directed translation, three address code, quadruples and triples.

Unit–IV.

Symbol Table & Error Detection And Recovery: Symbol tables, its contents and data structure for symbol tables; trees, arrays, linked lists, hash tables. Errors, lexical phase error, syntactic phase error, semantic error, Code Optimization & Code Generation: Code generation, forms of objects code, machine dependent code, optimization.

References:

1. Compilers Principle, Techniques & Tools - Alfread V. AHO, Ravi Sethi & J.D. Ullman; - 1998Addison Wesley.

2. Compiler Design by O.G. Kakde, 1995, Laxmi Publication.

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3. Theory and practice of compiler writing, Tremblay & Sorenson, 1985, Mc. Graw Hill.

4. System software by Dhamdae, 1986, MGH.

5. Principles of compiler Design, Narosa Publication

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MT-FT-33 PROGRAMMING WITH MATLAB

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Unit:I

What is MATLAB? , History of MATLAB, Origin, Growth and Development Features of MATLAB, Why to use MATLAB? , Menus and the toolbar, computing with MATLAB, Script file and the Editor Debugger, MATLAB Help System, Programming in MATLAB, Arrays: control flow, more data types, matrices, strings, cells, creating functions, user input, Arrays, Multidimensional Arrays, Element by Element Operation, Polynomial Operations Using Arrays, Cell Arrays, and Structure Arrays.

Functions & Files: Elementary Mathematical Functions, User Defined Functions, Advanced Function Programming, Working with Data Files, Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statement Loops, The Switch Structure, Debugging Mat Lab Programs.

Unit: II

2D/3D Plotting Visualization Using MATLAB

Basic 2-D Graph:- labels, Multiple plots on same graph, Line style marker and color, Labeling Axes, Legends, Manipulating Axes, Subplots, Multiple Y- Axis, Saving and Printing Graphs,3-D Plots, Animated 3-D with Comet3, Rotation of 3D Graphs and other Operations, Drawing Bar charts, Drawing Contours.

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Unit: III

Data Import and Export

Introduction to Data Import and Export, Other MATLAB I/O capabilities, Supported File Format, Working with Audio/Video File, Importing Audio/Video Data, Reading Audio/video Data From a file, Exporting Audio/Video Data, Example, Working with Spreadsheets, Writing to an XLS

File, Reading from an XLS Files, Working with Graphics File, Importing Graphics data, Exporting Graphics data, MATLAB-GUI with GUIDE, Creating a simple GUI Programmatically, Dissertations of different components in GUIDE, Creating Menus.

Unit: IV

Introduction to MATLAB Toolboxes

Simulink Introduction, Image & Video processing Toolbox: Application Level Image Processing Techniques, MRI Image processing, Fuzzy Logic Toolbox, Neural Network Toolbox.

References:

1. MATLAB and its Application in Engineering, Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar, Pearson Education.
2. Partha S Mallick, Matlab and Simulink: Introduction to Application, 2nd edi,SCITECH.
3. Stephen j Chapman, "*Matlab Programming for Engineers*", Thomson-Engineering Publisher, ISBN: 0534390560.
4. Duane C Hansel man, Bruce L Littlefield, "*Mastering MATLAB* 7",Prentice Hall ISBN:0131430181.
5. Gilat Amos, "*MATLAB: An Introduction with Application*", Wiley Publisher:; 1st edition(February 28, 2003) ISBN: 0471439975.
6. Duane C Hansel man, Bruce L Littlefield, "*Mastering MATLAB* 7", Prentice Hall. (2004).
7. Edward B. Magrab, Shapour Azarm, Balachandran, James Duncan, Keith Herold, Gregory Walsh, "An Engineer's Guid to Matlab", Prentice Hall. (2004).

MT-FT-34 & 35 (i) ADVANCED WEB TECHNOLOGIES

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

UNIT – I

Introduction: Search Engines: Searching techniques used by search engines, keywords, advertisements, Search Engine Optimization (SEO) for individual web pages: header entries, selection of URL; SEO for entire website: Hyperlinks and link structure, robots.

UNIT – II

Optimization: Optimizing images, Load balancers, Tuning MYSQL, query caching, query execution and optimization, traffic generation. Pitfalls in Optimization: optimization and testing, keyword density, duplicate contents, broken links, poor readability, navigation styles; tools for optimization: Google analytics

UNIT – III

PHP: Introduction, Data Types, Operators, Control Flow; Functions; Exception Handling, Storing and Retrieving Data, Arrays, String Manipulation and Regular Expressions, Object-Oriented PHP, Authentication with PHP, Interaction with File System and Server, Form processing, Handling Images, Session Management, Cookies.

UNIT – IV

Security: Introduction, Handling user access and user input, Bypassing client-side controls, Authentication, Session hijacking, Attacks on data stores: SQL query log, SQL injections; Attacks on Users: XSS attacks; Cross-site Request Forgery (CXRF), DoS and DDoS attacks, DNS Hijacking.

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Text Books:

1. Peter Smith, "Professional Website performance", Wiley India Pvt. Ltd.

2. Deitel H.M., Deitel P.J., "Internet & World wide Web: How to program", 4th Ed., Pearson Education.

3. Kogent Learning, "Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, AJAX – Black Book",
Wiley India Pvt. Ltd.

4. Stuttard D., Pinto M., "The Web Application Hackers Handbook", 2nd Ed., Wiley India Pvt. Ltd.

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MT-FT-34 & 35 (ii) SYSTEM SIMULATION AND MODELING

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Unit–1

Introduction : System Concepts, System boundaries and environment, continuous and discrete systems, system modelling, Type of Models, Modelling Methodology, Model validation, Principles & Nature of Computer modelling and simulation.

Unit–II

Continuous & Discrete : Analog vs. Digital Simulation, Continuous simulation vs. Numerical Integration9n; Concepts of simulation of continuous and discrete system with the help of live examples; Generation of random numbers, Generation of non-uniformly distributed random numbers, Generation of poisson and Erlang variates.

Unit–III

Simulators for the live systems : Simulation of a water reservoir system, Simulation of a hypothetical Computer. Simulation of queuing Systems: Basic concepts of queuing theory, Simulation of single-server, two server and general queuing systems, Simulation in Inventory Control systems : Elements of inventory theory, inventory models, simulators for complex Inventory systems.

Unit– IV

Design and Evaluation of Simulation Experiments : Length of simulation, run variance reduction techniques. Experiment layout and Validation. Simulation Languages : Continuous and discrete simulation languages, Block-Structured continuous simulation languages , Expression based languages, Discrete system simulation languages; GPSS, SIMSCRIPT, SIMULA , Factors in selection of discrete system simulation languages.

References:

1. Gordon G. : System Simulation " , Prentice-Hall of India Pvt. Ltd. New Delhi 1993.
2. Narsingh Deo :System Simulation with Digital Computer:, PHI New Delhi, 1993
3. Neelamkavil Frances : "Computer Simulation and modelling, John Wiley & Sons,NewYork, 1987.
4. Payne, James A. :" Introduction to Simulation: Programming Techniques and Methods of Analysis, McGraw-Hill International Editions, Computer Science Services, New York(1998).
5. Reitman Julian : "Computer Simulation Experiments", Wiley- Interscience, 1971.

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MT-FT-34 & 35 (iii) ADVANCEMENTS IN COMPUTING

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

UNIT – I

Cloud Computing: Definition, roots of clouds, characteristics, Cloud Architecture – public, private, hybrid, community, advantages & disadvantages of Cloud Computing.

Migrating into a Cloud: broad approaches, seven-step model to migrate

Virtualization: benefits & drawbacks of virtualization, virtualization types – operating system virtualization, platform virtualization, storage virtualization, network virtualization, application virtualization, virtualization technologies.

UNIT – II

Cloud Services & Platforms: Compute services, Storage services Database services, Application Services, Queuing services, E-mail services, Notification services, Media services, Content delivery services, Analytics services, Deployment & management services, Identity & access management services. Case studies of these services.

UNIT – III

Investigations and cyber forensics: Introduction to Cyber World, Cyber-attacks and cyber security, Information warfare and cyber terrorism, Types of cyber attacks, Cyber Crime and Digital Fraud, Overview of Types of computer forensics i.e. Media Forensics, Network forensics (internet forensics), Machine forensic, Email forensic (e-mail tracing and investigations)

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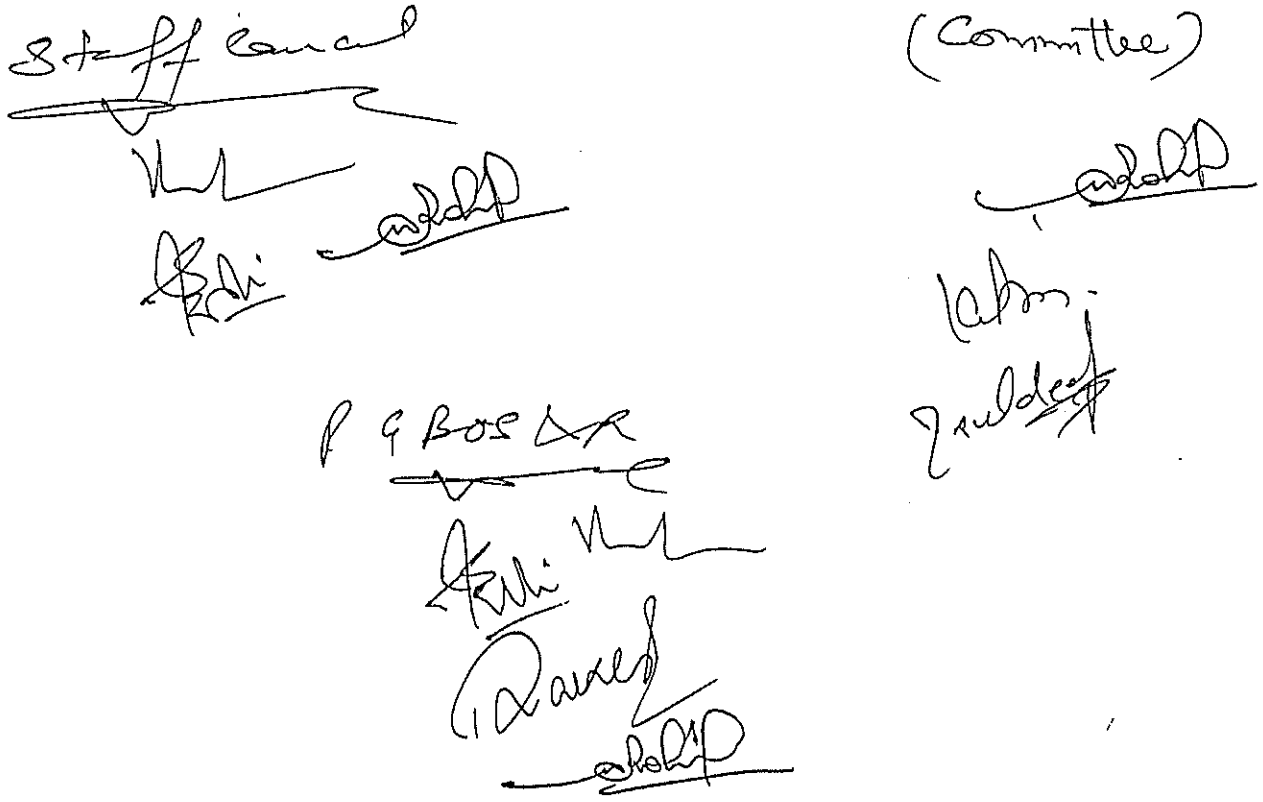
UNIT – IV

Forensic tools and report generation: Recovery of Deleted files in windows and Unix, Analyzing network traffic, sniffers, Ethical Hacking, Hardware forensic tools, scanning and vulnerability assessment tools, Password recovery tools, Mobile forensic tools and analysis of called data record Template for computer forensic reports

References:

1. Arshdeep Bahga, Vijay Madisetti, Cloud Computing – A Hands-on Approach, University Press, 2014
2. Saurabh Kumar, Cloud Computing, 2nd Edition, Wiley India Pvt Ltd.
3. Rajkumar Buyya, James Broberg, Andrzej Goscinski, Cloud Computing – Principles and Paradigms,
   Wiley India Pvt. Ltd.
4. Incident Response & Computer Forensics. Mandia, k, Prosise, c, Pepe, m. 2nd edition. Tata-McGraw Hill, 2003.
5. Guide to Computer Forensics and Investigations, 2nd edition, Bill Nelson, Amelia Phillips, Frank Enfinger, and Chris Steuart, Thomson Learning
6. Digital Evidence and Computer Crime, 2nd Edition , Eoghan Casey , academic Press File System Forensic Analysis by Brian Carrier , addition Wesley
7. Windows Forensic Analysis DVD Toolkit (Book with DVD-ROM), Harlan Carvey, syngress Publication



MT-FT-34 & 35 (iv) SOFTWARE PROJECT MANAGEMENT

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Unit-I

Introduction to Software Project Management (SPM): Definition of a Software Project (SP),SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.

Unit-II

Stepwise Project planning: Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

Unit-III

choice of process model, structured methods, rapid application development, waterfall, V-process-, spiral- models. Prototyping, Activity planning & Risk Management: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of lagged activities, adding the time dimension, backward and forward pass.

Unit-IV

Risk Management: Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule,.

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Resource allocation &Monitoring the control: Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.

References:

1. Software Project Management (2nd Edition), by Bob Hughes and Mike Cotterell, 1999, TMH
2. Software Engineering – A Practitioner"s approach, Roger S. Pressman (5th edi), 2001, MGH
3. Software Project Management, Walker Royce, 1998, Addison Wesley.
4. Project Management 2/c. Maylor
5. Managing Global software Projects, Ramesh, 2001, TMH

MT-FT-34 & 35 (v) INFORMATION & COMMUNICATION TECHNOLOGY

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Unit-1

Issues, opportunities and constraints in applications of modern information and communication technologies in following domains of public life: In trade and commerce (e-commerce), in business and management sector (e-business), In banking and finance sector (e-banking)

Unit-II

Issues, opportunities and constraints in applications of modern information and communication technologies in following domains of public life: In teaching-learning process (e-learning), in public governance (e-governance), in tourism and hospitality sector (e-tourism)

Unit-III

Issues, opportunities and constraints in applications of modern information and communication technologies in following domains of public life: In public health system (e-health), In agriculture and farming sector, In industry and transport sector

Unit-IV

Issues, opportunities and constraints in applications of modern information and communication technologies in following domains of public life: In journalism and mass communication (e- journalism), In rural development and women empowerment.

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References:

1. Information & Communication Technologies, Rajender Kumar, University Science Press. First Edition 2009.
2. Vikram Singh, Impact of Information & Communications Technologies in Public Life, Laxmi Publications, New Delhi. 2009.
3. Dennis P. Curtin, Information Technology: The Breaking Wave, TMH New Delhi
4. Sushila Madan, Introduction to Computer and Information System, 3e, Taxman's Publication

MT-FT-34 & 35 (vi) DATA MINING & DATA WAREHOUSE

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Unit-I

Overview of Object-Oriented, Client-Server Architecture and Distributed Database models. Enhanced Data Model for Advanced Application: An overview of Active Databases Spatial Databases Deductive Databases and Multimedia Databases

Unit -II

Data Warehousing: Characteristics of Data Warehouses Data Modeling for Data Warehouses, Building Data Warehouse, Functionality of Data Warehouses Difficulties in implementing Data Warehouses.

Unit-III

Data Mining: Overview of Data Mining Technology, Association Rules, Application to Data Mining, state- of- the-art Commercial Data Mining Tools.

Unit-IV

Web Interface to Database: Web Fundamentals, Database and the Web, Web Server and Sessions Providing access to Database of WWW Through Web server, Performance Tuning Performance Benchmarks.

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References:

1. Elmasri, Navathe, Fundamentals of Database systems, 3rd edition, Addison Wesley New Delhi.
2. Korth & Silberschatz, Database System Concept, 4th Edition, McGraw Hill International Edition.
3. Roiger, Data mining, Pearson Education.
4. Adriaans, Data Mining, Pearson Education.
5. Dunham / Sridhar, Data Mining: Introductory and Advanced Topics, Pearson Education.
6. Marakas, Modern Data Warehousing, Mining, and Visualization: Core Concepts, Pearson Education.

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References:

1. Elmasri, Navathe, Fundamentals of Database systems, 3rd edition, Addison Wesley New Delhi.
2. Korth & Silberschatz, Database System Concept, 4th Edition, McGraw Hill International Edition.
3. Roiger, Data mining, Pearson Education.
4. Adriaans, Data Mining, Pearson Education.
5. Dunham / Sridhar, Data Mining: Introductory and Advanced Topics, Pearson Education.
6. Marakas, Modern Data Warehousing, Mining, and Visualization: Core Concepts, Pearson Education.

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MT-CSE-410 – DISSERTATION

L/T	P	Credit	Int	Ext
2	-	2	-	Grade

The dissertation work shall be carried out by the student under the guidance of a supervisor who shall be a teacher of the Department. There will be a grading system as under:

i) Grade "A with distinction" – If a candidate deserves 75 percent of more marks.

ii) Grade "A" – If the candidate deserves 60 percent or more marks but less than 75 percent marks

iii) Grade "B" – If the candidate deserves 50 percent or more marks but less than 60 percent marks.

iv) Grade "F" – If the candidate deserves less than 50 percent marks.

The Dissertation shall be examined by two examiners (one Internal Examiner – a teacher of the Department, to be appointed by the Chairperson, and other an External Examiner). If the Examiners consider the dissertation work unsatisfactory they shall also point out in writing the defects and make suggestions for improvement and modifications, if a revision will render it acceptable. Such a candidate shall be allowed to resubmit the dissertation within the prescribed period of the course.

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