Master of Computer Applications

FIFTH SEMESTER EXAMINATION

Paper ID	Paper Code	Paper	L	T/P	Credit
044301	MCA 301	Linux Programming	3	1	4
044303	MCA 303	Software Testing	3	1	4
044305	MCA 305	Enterprise Computing with Java	3	1	4
Elective - I ***(Choose any One)***					
044307	MCA 307	Advanced Database Management Systems	3	1	4
044309	MCA 309	Numerical and Scientific Computing			
044311	MCA 311	Software Project Management			
044313	MCA 313	Multimedia Technologies			
044315	MCA 315	Mobile Computing			
044317	MCA 317	Artificial Intelligence			
044319	MCA 319	Microprocessors			
044321	MCA 321	Compiler Design			
Elective - II ***(Choose any One)***					
044323	MCA 323	Operational Research	3	1	4
044325	MCA 325	Distributed Systems			
044327	MCA 327	Financial Accounting			
044329	MCA 329	Organizational Behavior			
044331	MCA 331	Advanced Computer Architecture			
044333	MCA 333	Software Quality Management			
044335	MCA 335	Digital Signal Processing			
044337	MCA 337	Research Project			
Practical					
044351	MCA 351	Linux Programming Lab	0	2	1
044353	MCA 353	Software Testing Lab	0	2	1
044355	MCA 355	Enterprise Computing with Java Lab	0	4	2
044357	MCA 357	Lab based on Elective - I	0	2	1
NUES					
044361	MCA 361	General Proficiency – V* (It is suggested to have Intellectual Property Rights - Software Systems Oriented Course)	0	2	1
		Total	**15**	**17**	**26**

*** Non-University Examination System (NUES)**

Paper Code: MCA-301 **L T C**
Paper: Linux Programming **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES: *The main objective of this course is to provide Students*

- *A comprehensive overview of the Linux operating system along with Shell commands and shell scripting*
- *Implementation of Linux System programmes through GCC compiler.*
- *Understanding of basic concept of Socket programming (TCP and UDP)*

PRE-REQUISTE:

- Operating system
- Computer Network
- C /C++ Programming

UNIT – I

Linux – The Operating System: Linux history, Linux features, Linux distributions, Linux's relationship to Unix, Overview of Linux architecture, Installation, Start up scripts, system processes (an overview),Linux Security, The Ext2 and Ext3 File systems :General Characteristics of, The Ext3 File system, file permissions. User Management: Types of users, The powers of Root, managing users (adding and deleting): using the command line & GUI tools.

[No. of Hrs.: 10]

UNIT – II

Resource Management in Linux: file and directory management, system calls for files Process Management, Signals, IPC: Pipes, FIFOs, System V IPC, Message Queues, system calls for processes, Memory Management, library and system calls for memory. **[No. of Hrs.: 10]**

UNIT – III

Shell Programming:Available shells under Linux (viz. Bash, TCSH, Korn or so on), different Shell features, editors, shell commands, shell scripts: shell variables, environmental variables, purpose of shell scripts, writing, storing and executing scripts, Filters- The grep family, advanced filters-sed and awk.

[No. of Hrs.: 10]

UNIT – IV

Networking in LINUX: Socket Introduction, Elementary TCP Sockets (Socket Function, Connect Function, Bind, Listen, Accept, Fork and Exec), TCP Client server Example, Elementary UDP Sockets.

[No. of Hrs.: 10]

TEXT BOOKS:

1. Arnold Robbins, "Linux Programming by Examples The Fundamentals", Pearson Education, 2nd Ed., 2008.
2. Cox K, "Red Hat Linux Administrator's Guide", PHI, 2009.
3. R. Stevens, "UNIX Network Programming", PHI, 3rd Ed., 2008.
4. Sumitabha Das, "Unix Concepts and Applications", TMH, 4th Ed., 2009.

REFERENCES:

1. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, “Linux in a Nutshell”, O'Reilly Media, 6th Ed., 2009.
2. Neil Matthew, Richard Stones, Alan Cox, “Beginning Linux Programming”, 3rd Ed., 2004.
3. Robert Love, “Linux System Programming” ,O'Reilly Media, 2nd Ed., 2007.
4. Yashwant Kanetkar , “Unix Shell Programming”, BPB, 7th Ed., 2007.
5. Bach, “The Design of the Unix Kernel”, PHI, 2000.
6. Christopher Diaz, “Introduction to Unix, Linux”, Pearson 3rd Ed.2009.
7. Evi Nemeth, Garth Snyer, Trent R. Hein, “Linux Administrator Handbook”, Pearson, 2nd Ed., 2007.
8. Mark G. Sobell, “A Practical Guide to Ubuntu Linux”, Pearson, 2nd Ed., 2008.
9. Cox K, “Red Hat Linux Administrator’s Guide”, PHI, 2001.
10. Peterson Richard, “The Complete References Linux”, 2nd Ed., Tata McGraw Hill, 2000.
11. Tammy Fox, “Red Hat Enterprise Linux 5.0 Administrator Unleashed”, SAMS.

Code No. MCA 303 **L T C**
Paper: Software Testing **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *At the end of this course the student will be able to:*

- *Appreciate the fundamentals of software testing and its application through the software life cycle.*
- *Develop skills in designing and executing software tests suitable for different stages in the software life cycle.*
- *Understand and appreciate the role of software testing in systems development, deployment and maintenance.*
- *Develop a continuing interest in software testing, and obtain satisfaction from its study and practice.*
- *Appreciate the responsibilities of software testers within software projects, the profession and the wider community.*

PRE-REQUISITE:

- Software Engineering Concepts

UNIT - I

Introduction: What is software testing and why it is so hard?, Some Software Failures, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, V Shaped Software Life Cycle Model, No absolute proof of correctness, Overview of Graph Theory.

Verification Testing: Verification Methods, SRS Verification, Software Design Document Verification, Code Reviews, User Documentation Verification, Software Project Audits.

[No. of Hrs.: 08]

UNIT - II

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Identification of Independent Paths: Control Flow Graph, DD-Paths, Cyclomatic Complexity, Graph Matrix, Control Flow Testing, Data Flow Testing, Slice Based Testing, Mutation testing. **[No. of Hrs.: 10]**

UNIT - III

Use Case Testing: Use Case Diagrams and Use Cases, Generation of Test Cases from Use Cases, Applicability. Validity Checks: Strategy for Data Validity, Guidelines for Generating Validity Checks. Database testing.

Selection, Minimization, Prioritization of test cases for Regression Testing: Regression Testing, Regression Test Case Selection, Prioritization guidelines, Priority category Scheme, Code Coverage Techniques for Prioritization of Test Cases, Risk Analysis. **[No. of Hrs.: 12]**

UNIT - IV

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging

Object Oriented Testing: Issues in Object Oriented Testing, Path testing, Class Testing, state based testing, Object Oriented Integration and System Testing.

Metrics and Models in Software Testing: What are Software Metrics, categories of Metrics, object Oriented Metrics used in testing, What should we measure during testing?, Software Quality Attributes.

Prediction Model: Reliability Modes, Fault Prediction Model. **[No. of Hrs.: 12]**

TEXT BOOKS:

1. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, Van Nostrand Reinhold, New York, 2nd Ed., 1995.
2. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Van Nostrand Reinhold, New York, 2nd Ed., 1993.
3. Boris Beizer, "Software Testing Techniques", Second Volume, Van Nostrand Reinhold, New York, . 2nd Ed., 1990.
4. Louise Tamres, "Software Testing", Pearson Education Asia, 2002.
5. Aditya P. Mathur, "Foundation of Software Testing", Pearson, 2008.

REFERENCES:

1. Paul C. Jorgenson, Software Testing A Craftsman's approach, CRC Press, 1997.
2. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", , McGraw-Hill International Edition, New Delhi, 5th Ed., 2001.
3. Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
4. K. K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 3rd Ed., 2003.
5. Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.
6. Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.
7. Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts, 1989.
8. Boris Beizer, "Software System Testing and Quality Assurance", Van Nostrand Reinhold, New York, 1984.
9. Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.
10. Elfriede Dustin, "Effective Software Testing: 50 Specific ways to improve your Testing", Pearson, 2003.
11. Dorothy Graham, Erik Van Veenendaal, Isabel Evans and Rex Black, "Foundation of Software Testing, ISTQB Certification", PHI, 8th Ed., 2009.

Code No.: MCA 305 **L T C**
Paper: Enterprise Computing in Java **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *In this course student will learn about J2EE technology and will be able to develop dynamic websites. This course will explain how Enterprise JavaBeans (EJBs) contain the application's business logic and business data.*

PRE-REQUISITES:

- Core JAVA

UNIT I

Introduction to J2EE and building J2EE applications, MVC architecture, Introduction to servlets and it's life cycle , problems with cgi-perl interface , generic and http servlet , servlet configuration, various session tracking techniques, servlet context, servlet configuration, servlet colloboration.
[No. of Hrs. : 10 Hrs]

UNIT II

JSP Basics and Architecture: JSP directives, Scripting elements, standard actions, implicit objects, jsp design strategies.
Struts**:** Introduction of Struts and its architecture, advantages and application of Struts.
[No. of Hrs. : 12 Hrs]

UNIT III

EJB fundamentals: Motivation for EJB, EJB Echo system, J2EE technologies, Enterprise beans and types, distributed objects and middleware, developing EJB components, remote local and home interface, bean class and deployment descriptor. **[No. of Hrs.: 10 Hrs]**

UNIT IV

Introducing session beans: Session beans life time, statefull and Stateless session beans beans, lifecycle of session beans.
Introducing Entity beans: persistence concepts, features of entitiy beans , entity context,
Introduction to JMS & Message driven beans. **[No. of Hrs. : 10 Hrs]**

TEXT BOOKS:

1. Ed Roman, Scott W Ambler, Tyler Jewell, "Mastering Enterprise Java Beans", Wiley, 2nd Ed., 2005.
2. Govind Sesadri , "Enterprise Java Computing: Application and Architectures", Cambridge University Publications, 1999.
3. Subrahamanyam Allamaraju, Cedric Buest, "Professional Java Server Programming, J2EE, Apress, 1.3 Ed., 2005.
3. Ivan Bayross and Sharanam Shah, "Java Server Programming" , Shroff .
4. John Hunt and Chris Loftus, "Guide to J2EE: Enterprise Java" Springer Verlag Publications.
5. Govind Seshadri, "Enterprise Java Computing: Application and Architectures", Cambridge University Press, 1999.

REFERENECES:

1. Ted Neward, “Effective Enterprise Java”, Eddison -Wesley, 2004.
2 Jim Farley, William Crawford, “ Java Enterprise in a Nutshell”, O’Reilly and Associates, 3rd Ed.
3. Austin Sincock , “Enterprise Java for SAP” , A Press Publications.
4. Joe Wigglesworth and McMilan Paula, “Java Programming: Advanced Topic”, Thomson, 3rd Ed., 2003.

Code No. MCA 307 **L T C**
Paper: Advanced Database Management System **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES: *This course is an attempt to provide you with the advanced information about database management system and their development. This course also provides the conceptual background necessary to design and develop distributed database system for real life applications.*

PRE-REQUISITE:

- Centralized Database Management System Concepts

UNIT -I

Review of traditional DBMS's, relational algebra and relational calculus, design principles, normalization, transaction and concurrency control, recovery management. **[No. of Hrs.: 10]**

UNIT -II

Design Process: Design process, design evaluation, modeling process, E-R model, and semantic data model, object oriented model, models and mapping normalization and denormalization. Data warehousing, OLAP and data mining. **[No. of Hrs.: 12]**

UNIT -III

Architecture: Architecture of SQL server, SQL server and Oracle sever tuning, SQL server tuning, Oracle server tuning, OS tuning (Microsoft OS's). **[No. of Hrs.; 08]**

UNIT-IV

Distributed Database Management Systems, Components, levels of data & process distribution, transparency features, data fragmentation, data replication, Client Server Systems, Principles, components, ODBC, ADO, JDBC and JSQL overview. **[No. of Hrs.: 12]**

TEXT BOOKS:

1. C. J. Date, "Introduction to Database Systems", AWL.
2. J. L. Warrington , "Object Oriented Database Design", Morgan Kaufman.
3. T. J. Tewrey, "Database Modeling and Design", Morgan Kaufman.

REFERENCES:

1. DB2, Oracle & SQL Server Documentation.

Code No. MCA 309 **L T C**
Paper: Numerical and Scientific Computing **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES: *This course responds to the needs of the engineering and physical sciences curricula by providing an applications-oriented introduction to numerical methods/analysis. Rather than a pure discussion and analysis of methods, we shall often integrate a discussion of the properties of engineering and physical problems with the discussion of methods by which such problems may be solved numerically. This approach is more "natural" and more like the one students actually follow when applying numerical methods within their areas of interest.*

PRE-REQUISITE:

- Basic of Mathematics

UNIT - I

Floating Point Arithmetic: Representation of floating point numbers: Operations, Normalization, Pitfalls of floating point representation. Errors in numerical computation. Solution of Transcendental and Polynomial Equations: Zeros of a single transcendental equation and zeros of a polynomial using Bisection Method, Iteration Method, Regula-Falsi method, Newton-Raphson method. Rate of convergence of Iterative methods. Methods for finding complex roots. **[No. of Hrs.: 10]**

UNIT - II

Systems of Linear equations:Solutions of systems of Linear equations. Gauss Elimination: Direct method and pivoting. LU-decomposition method, Gauss Seidal iterative method, Rate of Convergence of Gaus Seidal method, Ill Conditioned system of equations, Refinement of solutions. Interpolation and Approximation:Langrange's Interpolation, Newton Divided difference method. Finite Differences, Polynomial Interpolation**:** Newton's forward and backward formula, Central Difference Formulae: Gauss forward and backward formula, , Everett's formula. Hermite's Interpolation. Approximation of function by Taylor's series and Chebyshev polynomial. **[No. of Hrs.: 10]**

UNIT - III

Numerical Differentiation and Integration:Introduction to Numerical Differentiation. Numerical Integration: Trapezoidal rule, Simpson's rules, Boole's Rule, Weddle's Rule, Gauss quadrature formulas, Romberg's integration,.Numerical Solution of Ordinary Differential Equations: Picard's Method, Taylor's series method, Euler's Method, Modified Euler's method, Runge-Kutta (RK) methods: second and fourth order RK methods, Automatic error monitoring, stability of solution. Boundary value problems: Finite Difference method. **[No. of Hrs.: 12]**

UNIT - IV

Method of least squares, fitting of straight lines, polynomials, exponential curves etc, Linear and Non-linear regression, Multiple regression, Moving averages, smoothening of curves. Random Sampling, Sampling distributions: Mean, Variance, Difference of Means, and Proportions. Parameter Estimation: method of Moments, Maximu m Likelihood Estimation, Interval

Estimation. Hypothesis Testing: Mean, Variance, Difference of Means, Proportions. Chi-square Test for best fit. **[No. of Hrs.: 10]**

TEXT BOOKS:

1. Curtis F. Gerald and Patrick O. Wheatley, " Applied Numerical Analyses" , Prientice Hall, 1984.
2. D. Kincaid and W. Cheney, "Numerical Analysis: Mathematics of Scientific Computing", Thomson/Brooks Cole, 1991.
3. D. Kincaid and W. Cheney, "Numerical Analysis" , Thomson/Brooks-Cole., 2002.

REFERENCES:

1. Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations ", New Age Int.
2. Grewal B. S., "Numerical methods in Engineering and Science", Khanna Publishers, Delhi.
3. T. Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods", TMH.
4. Pradip Niyogi, "Numerical Analysis and Algorithms", TMH.
5. Francis Scheld, "Numerical Analysis", TMH.

Code No.: MCA 311 **L T C**
Paper: Software Project Management **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *Software Project Management provides insight to the importance of careful project management. Topics are presented in the same order that they appear in the progression of actual projects and covers the following concepts.*
The course will introduce and develop the concepts that are seen as central to the effective management of software projects.
Basic measurements are presented with examples from real-world projects, which show how a project can be monitored, controlled and assessed.

PRE-REQUISITE:

- Software Engineering Concepts
- Academic Project

UNIT - I

Introduction: Introduction to software project management and control Whether software projects are different from other types of projects. The scope of project management. The management of project life cycle. Defining effective project objectives where there are multiple stakeholders. Software Tools for Project Management.

Project Planning: Creation of a project plan -step by step approach, The analysis of project characteristics in order to select the best general approach, Plan Execution, Scope Management, Use of Software (Microsoft Project) to Assist in Project Planning Activities. **[No. of Hrs.: 10]**

UNIT - II

Project Scheduling: Time Management, Project Network Diagram, Critical path Analysis, PERT, Use of Software (Microsoft Project) to Assist in Project Scheduling.

Project Cost Management: Resource planning, Cost Estimation (Types, Expert Judgment, Estimation by Analogy, COCOMO). **[No. of Hrs.: 12]**

UNIT - III

Project Quality Management: Stages, Quality Planning, Quality Assurance, Quality Control, Quality Standards, Tools and Techniques for Quality Control.

Project Human Resource Management: Definition, Key to managing People, Organization Planning, Issues in Project Staff Acquisition and Team Development, Using Software to Assist in Human Resource Management, Communication Planning, Information Distribution, Performance Reporting.

[No. of Hrs.: 10]

UNIT - IV

Project Risk Management: Common Sources of Risk in IT projects, Risk Identification, Risk Quantification, Risk Response Development and Control.

Project Procurement Management: Procurement Planning, Solicitation, Source Selection, Contract Administration.

Introduction to Project Management Process Groups, Project Controlling and Configuration Management.

[No. of Hrs.: 10]

TEXT BOOKS:

1. Bob Hughes, Mike Cotterell, "Software Project Management" Tata McGraw-Hill, 3rd Ed.
2. Pankaj Jalote, " Software Project Management in Practice", Pearson Education, 3rd Ed. , 2010.
3. Kathy Schwalbe ,"Information Technology Project Management, THOMSON Course Technology, " International Student Edition, 2003.
4. Elaine Marmel, "Microsoft Office Project 2003 Bible", Wiley Publishing Inc.

REFERECES:

1. S.A. Kelkar, "Software Project Management - A Concise Study", PHI, Revised Edition, 2003.
2. Demarco T. and Lister T., " Peopleware: Productive Projects and Teams", Dorset House, 2nd Ed. ,1999.
3. Henry, J., "Software Project Management – A Real-World Guide to Success", Addison-Wesley, 2004.
4. Ince D., Sharp H. and Woodman M. , "Introduction to Software Project Management and Quality Assurance", McGraw-Hill., 1993.
5. Maylor, H., "Project Management", PHI, 3rd Ed., 2002.
6. Robert T. Futrell, "Quality Software Project Management", Pearson, 2010.
7. Bentley C. , "PRINCE2: A Practical Handbook", NCC Blackwell, 2002.
8. Robert T. Futrell, "Quality Software Project Management", Pearson, 2010.

Code No. MCA 313 **L T C**
Paper: Multimedia Technologies **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES: *As technology advances and hardware and software improves, it becomes much more feasible to integrate multimedia directly into classroom activities and the core curriculum. Understanding why, when, and where multimedia is appropriate and beneficial is the first step toward successful implementation.*

- *To study the graphics techniques and algorithms.*
- *To study the multimedia concepts and various I/O technologies.*
- *To enable the students to develop their creativity*

PRE-REQUISITE:

- Multimedia Application

UNIT – I

Introductory Concepts: Multimedia – Definitions, CD-ROM and the Multimedia Highway, Uses of Multimedia, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia skills and training, Training opportunities in Multimedia. Multimedia-Hardware and Software: Multimedia Hardware – Macintosh and Windows production Platforms, Hardware peripherals – Connections, Memory and storage devices, Media software – Basic tools, making instant multimedia, Multimedia software and Authoring tools.

[No. of Hrs.: 10]

UNIT – II

Multimedia – making it work – multimedia building blocks – Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different algorithms concern to text, audio, video and images etc., Working Exposure on Tools like MAYA.

[No. of Hrs.: 16]

UNIT – III

Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, VRML, Designing for Multimedia Applications – Media Communication.

[No. of Hrs.: 08]

UNIT – IV

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology.

[No. of Hrs.: 08]

TEXT BOOKS:

1. Steve Heath, "Multimedia & Communication Systems", Focal Press, UK, 1999.
2. Tay Vaughan, "Multimedia: Making it work", TMH, 1999.
3. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI, PTR, 2000.

REFERENCES:

1. Keyes, "Multimedia Handbook", TMH, 2000.
2. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications & Applications", Pearson, 2001.
3. Steve Rimmer, "Advanced Multimedia Programming", PHI, 2000.
4. Ze-Nian Li. and Mark S. Drew, "Fundamentals of Multimedia", PHI, 2010.

Code No. MCA 315 **L T C**
Paper: Mobile Computing **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *This course will cover a broad selection of topics in data communications, resource management, network protocols, distributed computing, information management, user interfaces, applications/services, and security. Students will learn the principles of Mobile Computing and its enabling technologies, and explore a young but rich body of exciting ideas, solutions, and paradigm shifts*.

PRE-REQUISITE:

- Operating Systems
- Networking
- Distributed Computing.
- Programming skill in C/C++

UNIT - I

Cellular Mobile Wireless Networks: Systems and Design Fundamentals, Propagation Models Description of Cellular system, Frequency Reuse, Co channel and Adjacent channel interference, Propagation Models for Wireless Networks, Multipart Effects in Mobile Communication, Models for Multipart Reception Evolution of Modern Mobile Wireless Communication System - First Generation Wireless Networks, Second Generation (2G) Wireless Cellular Networks, Major 2G standards, *2.5G* Wireless Networks, Third Generation 3G Wireless Networks, Wireless Local Area Networks (WLANs), All-IP Network: Vision for 4GIssues in Mobile computing, Wireless Multiple Access protocols , channel Allocation.

[No. of Hrs.: 12]

UNIT – II

Data management issues: mobility, wireless communication and portability, data replication Schemes , basic concept of multihopping, Adaptive Clustering for mobile Network , Multicluster Architecture.

[No. of Hrs.: 10]

UNIT – III

Location Management: Introduction**,** Location Based Services , Automatically Locating Mobile Users, Locating and Organizing Services, Is Use and future directions, mobile IP, Comparison of TCP wireless.

[No. of Hrs.: 10]

UNIT - IV

Transaction management: Introduction, Data Dissemination, Cache Consistency, Mobile transaction processing, mobile database research directions, Security fault tolerance for mobile N/W.

[No. of Hrs.: 10]

TEXT BOOKS:

1. Schiller, “Mobile Communications”, Pearson.

2. Shambhu Upadhyaya, Abhjeet Chaudhary, Keviven Kwiat,Mark Weises, “Mobile Computing”, Kliuwer Acadmic Publishers.
3. UIWE Hansmann, Other Merk , Martin-S-Nickious, Thomas Stohe, “Principles of Mobile computing”, Springer international Edition.

REFERENCES:

1. C. K. TOH , “Mobile Adhoc Networks”, TMH.
2. Sipra DasBit, Biplab K. Sikdar, “Mobile Computing, PHI, 2009.
3. Kumkum Garg, “Mobile Computing”, Pearson.

Code No. MCA 317 **L T C**
Paper: Artificial Intelligence **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE:*This course covers the issues and techniques involved in the creation of computer systems that engage in intelligent behaviour. Students will explore problem-solving paradigms, logic and theorem proving, search and control methods, and learning.*
Learning outcome of this course is

- *Introducing students to the basic concepts and techniques of Artificial Intelligence.*
- *Learning AI by doing it, i.e. developing skills of using AI algorithms for solving Practical problems.*

PRE-REQUISITES:

- Discrete Mathematic
- Analysis of Algorithms

UNIT- I

Intelligent Agents – Agents and environments - Good behavior – The nature of environments – structure of agents - Problem Solving - problem solving agents – exa mple problems – searching for solutions – uniformed search strategies - avoiding repeated states – searching with partial information.

[No. of Hrs.: 10]

UNIT- II

Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Ga mes – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an elemen t of chance.

[No. of Hrs.: 12]

UNIT- III

First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution – Knowledge representation - Ontological Engineering - Categories and objects – Actions - Simu lation and events - Mental events and mental objects. **[No. of Hrs.: 10]**

UNIT -IV

Learning from observations - forms of learning - Inductive learning - Learn ing decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation base learning – Learn ing using relevant information – Inductive logic programming – Statis ical learning methods - Learn ing with complete data - Learn ing with hidden variable - EM algorithm – Insta ce based learning - Neural networks - Reinforcement learning – Passive reinforcement learning - Active r inforcement learning - Generalization in reinforcement learning.

[No. of Hrs.: 10]

TEXT BOOK:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach ", Pearson, 2nd Ed.
2. D. W. Paterson, "Introduction to Artificial Intelligence and Expert System", PHI, 2009.
3. George F. Luger, "Artificial Intelligence- Structures and Strategies For Complex Problem Solving", Pearson Education, 5th Ed., 2010.
4. Elaine Rich and Kevin Knight, "Artificial Intelligence ", Tata McGraw-Hill.
5. Michel Negneritsky, "Artificial Intelligence: A Guide to Intelligent System", Addison Wesley, 2nd Ed.

REFERENCES:

1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis ", Narosa.
2. R. J. Schalloff, "Artificial Intelligence –An Engineering Approach", McGraw Hills, International Ed. , Singapore,1992.
3. M. Savi Kumar, S. Ramani, "Rule Base Expert System", Narosa Publishing House.
4. Rejendra Akerkar, "Introduction to Artificial Intelligence", PHI, 4th Ed., 2009.
5. Joseph C. Giarratano, Gary D. Riley, "Expert System Principles and Programming", Cengage Learning, 3rd Ed., 2009.

Code No. MCA 319 **L T C**
Paper: Microprocessors **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE:*The objective of this course is to introduce students to features and technology of microprocessor systems. Gain experience in assembly language programming of microproessor peripherals and interrupt service routines, as well as data processing tasks.At the end of the course the student should:*

- *Know basics of microprocessor-based Systems.*
- *Know basics of assembly language.*
- *Know the process of compilation from high level language to assembly language to machine language.*
- *Know interaction between hardware and software, i.e. `interfacing'.*

PRE-REQUISITE:

- Digital Systems Fundamentals
- Assembly Language Programming
- Electronics

UNIT – I

Computer Number Systems, Codes, and Digital Devices: Computer Number Systems and Codes, Microprocessor Evolution and Types, the 8086 microprocessor family-overview, 8086 internal architecture, introduction to programming the 8086, addressing modes of 8086.8086 Family Assembly Language Programming: Program Development Steps, Constructing the machine codes for 8086 instructions, writing programs for use with an assembler, assembly language program development tools.

[No. of Hrs.: 10]

UNIT – II

Implementing Standard Program Structures in 8086 Assembly Language: Simple Sequence Programs, Jumps, Flags, and Conditional Jumps, If-Then, if-then-else, and multiple if-then else programs, while-do programs, while-do programs, repeat-until programs, instruction timing and delay loops Strings, Procedures, and macros: the 8086 string instructions, writing and using procedures, writing and using assembler macros 8086 Instruction Descriptions and Assembler Directives.

[No. of Hrs.: 11]

UNIT – III

8086 System Connections, Timing, and Troubleshooting: A basic 8086 microcomputer System, An example Minimum-mode System, the SDK-86, Troubleshooting a simple 8086- based microcomputer, Timing Diagrams 8086 Interrupts and Interrupt Applications: 8086 interrupts and Interrupt Responses, Hardware Interrupt Applications. **[No. of Hrs.: 11]**

UNIT – IV

Interfacing 8086 with 8255, 8254, 8259, 8253, 8251, 8259, 8279.
Brief Introduction to Architecture of 80186, 80286, 80386, 80486, 8087 and Pentium architecture.

[No. of Hrs.: 10]

TEXT BOOKS:

1. D. V. Hall, "Microprocessors and Interfacing", TMH, 2nd Ed., 1999
2. Barry B, "The Intel Microproccessors Architecture, Programming and Interfacing", Pearson, 8th Ed., 2009.
3. John Uffenbeck, "The 8086 / 8088 Family Design Programming and Interfacing", PHI, 2009.

REFERENCES:

1. Peter Able, "IBM PC Assembly Language Programming", PHI, 1994.
2. James. L. Antonaks, "An Introduction to the Intel Family of Microprocessors", Addison Wesley, 1999.
3. Liu Gibson, "Microprocessor Systems: The 8086/8088 Family Architecture, Programming & Design", PHI, 1999.
4. Walter A. Triebel, Avtar Singh, "Programming Interfacing Software Hardware and Applications", Pearson, 4th Ed., 2009.
5. Frank Tsui, Orlando Karan, "Essentials of Software Engineering", Jones and Bartletts, 2nd. Ed., 2010.

Code No. MCA 321 **L T C**

Paper: Compiler Design **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES: *This course develops the mathematical basis for syntax specification and translation and shows how this basis can be used to design and implement compilers? Learning outcomes of this course are:*

- *To stimulate deeper learning of algorithms and data structures by practicing compiler writing algorithm.*
- *To develop Skills to use Tools like Lex and YACC in writing scanners and parsers.*
- *To develop a cross-compiler.*

PRE-REQUISITES

- Programming Language
- Theory of Computation
- Design and Analysis of Algorithms
- Computer Organization

UNIT - I

Compiler Structure: Analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction. Lexical analysis: Interface with input parser and symbol table, token, lexeme and patterns, difficulties in lexical analysis, error reporting and implementation. Regular grammar & language definition, Transition diagrams, design of a typical scanner using LEX or Flex.

[No. of Hrs.: 10]

UNIT - II

Syntax Analysis: Context free grammars, ambiguity, associability, precedence, top down parsing, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing LL(1) grammar, Nor LL(1) grammar, Bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), Design of a typical parser using YACCor Bison.

[No. of Hrs.: 10]

UNIT - III

Syntax directed definitions: Inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions. Type checking: type: type system, type expressions, structural and name equivalence of types, type conversion, overloaded function and operators, polymorphic function. Run time system: storage organization, activation tree, activation record, parameter passing symbol table, dynamic storage allocation. Intermediate code generation: intermediate representation, translation of declarations, assignments, Intermediate Code generation for control flow, Boolean expressions and procedure calls, implementation issues.

[No. of Hrs.: 12]

UNIT - IV

Code generation and instruction selection: Issues, basic blocks and flow graphs, register allocation, code generation, DAG representation of programs, code generation from DAGS, peep hole optimization, code generator generators, specification of machine.

Code optimization: source of optimizations, optimization of basic blocks, loops, global dataflow analysis, solution to iterative dataflow equations, code improving transformations, dealing with aliases, data flow analysis of structured flow graphs. **[No. of Hrs: 10]**

TEXT BOOKS:

1. K. C. Louden, "Compiler Construction, Principle and Practice", Cengage Publication 6th Ed. ,2009.
2. Alfred V. Aho, Ravi Sethi and Jeffrey, "Compilers Priciples, Techniques and Tools", D. Ullman, Pearson, 1998.
3. V.Raghvan, "Principles of compiler Design", TMH, 2009.
4. Levine, Mason and Brown, "Lex & Yacc", O' Reilly, 1998.

REFERENCES:

1. S. S. Muchnick Harcourt Asra, "Advanced Compiler Design implementation", Morgan Kaufman, 2006.
2. Allen,"Modern Compiler Implementation in C", Cambridge Uty. Press 1997.
3. Alan I. Holub, "Compiler Design in C", PHI, 2009.
4. VinuV. Das,"Compiler Design using FLEX and YACC", PHI, 2005.
5. Cooper, "Engineering a Compiler", Elsevier, 2005.
6. Fisher, "Crafting a Compiler in C", Pearson 2005.

Code No. MCA 323 **L T C**

Paper: Operational Research **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES: *This course is to equip students with the ability of conceptualization of real life systems in the form of mathematical models. Learning Outcome of this course are:*

- *Understanding of Principles of model building and basic optimization concepts.*
- *To Develop skills to deploy these concepts indiverse fields of application in manufacturing /service/ distribution systems.*

PRE-REQUISITES:

- Design and Analysis of Algorithms
- Programming Language

UNIT-I

Introduction to operations research, Overview of OR modeling. Linear Programming (LP): Assumptions of LP models, LP problem formulation, Graphical methods for solving LP problems. The Simplex method, Big M-method and Two-Phase simplex method, Duality: Definition of the dual problem, relationship between the primal and dual solutions, Economic interpretation of duality, the dual Simplex method, sensitivity analysis. Transportation and Assignment problems. Integer programming models, Cutting Plane method, Branch and Bound method.

[No. of Hrs: 11]

UNIT-II

JobSequencingModels:Sequencing problems, Johnson's algorithm for processing *n* jobs on two machines and *n* jobs on three machines, Processing 2 jobs on *n* machines using graphical method. Review of Network models, minimal spanning tree algorithm, and shortest route problems: Dijkstra's algorithm, Maximal flow model, maximal flow algorithm, min-cut, min-cut Max-flow theorem.

[No. of Hrs: 11]

UNIT-III

Project Scheduling by CPM/PERT: Designing an activity network, Critical path calculations, Determination of floats, Program Evaluation and Review Technique (PERT). Cost-Time analysis of projects : crashing activities in a project. **[No. of Hrs: 10]**

UNIT-IV

Queuing systems, Elements of queuing model, role of exponential distribution, birth and death models, steady statemeasures of performance, single server models ,multiple-server models, machine servicing model, Pollaczek-Khintchine formula, queuing decision models. Multi criteria Decision making, Introduction to Game theory, Zero-sum Game. **[No. of Hrs: 10]**

TEXT BOOKS:

1. H. Taha, "Operations Research: An Introduction", PHI, 8th Ed., 2009.
2. Hilier and Liebermann, "Introduction to Operations Research", McGraw-Hill, 8th Ed., 2009.

3. Wayne Winston, "Operations Research: Applications and Algorithms", Cengage, 4th Ed., 2009.

REFERENCES:

1. J. K. Sharma, "Operation Research Theory and Applications", 3rd Edition, Macmillan, India.
2. Paul A. Jensen, "Operations Research Models and Methods", John Wiley, 2003.
3. G. Srinivasan, "Operational Research Principles and Applications", PHI, 2nd Ed., 2008.
4. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operational Research", Pearson, 4th Ed., 2009.

Code No. MCA 325 **L T C**
Paper: Distributed DBMS And Object Oriented Databases **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIV: *An in-depth study of design and implementation issues in distributed database systems, together with a coverage of Database distribution architectures ,Distributed database design, Distributed query processing, Distributed query optimization, Distributed transaction management, Distributed concurrency control, Distributed reliability protocols and Multi-database systems.*

PRE-REQUISITE

- Database Management System
- Distributed Systems

UNIT – I

Distributed DBMS features and needs, Reference Architecture, Levels of Distribution Transparency, Replication, Distributed database design – Fragmentation, allocation criteria, Storage mechanisms, Translation of Global Queries / Global Query Optimization, Query Execution and access plan.

[No. of Hrs.: 12]

UNIT – II

Concurrency control – 2 phase locks, distributed deadlocks, time based and quorum based protocols, comparison reliability – non-blocking commitment protocols, Partitioned networks, Check points and Cold starts. **[No. of Hrs.: 10]**

UNIT – III

Management of Distributed Transactions – 2 phase unit protocols, Architectural aspects, Node and link failure recoveries, Distributed data dictionary management, Distributed database administration.

[No. of Hrs.: 10]

UNIT – IV

Heterogeneous database-federated database, reference architecture, loosely and tightly coupled, Alternative architectures, Development tasks, operation – global task management, Client server databases – SQL server, Open database connectivity, Constructing an Application.

Advance Database Concept:

Object Oriented Databases Introduction, Advantages and Disadvantages, Spatial Databases, Multimedia Databases, Deductive Databases, Temporal Databases. **[No. of Hrs.: 10]**

TEXT BOOKS:

1. S. Ceri, G. Pelagatti, "Distributed Database: Principles and Systems", McGraw Hill, New York, 1985.
2. M. Tamer Ozsu, Patrick Valduriez, "Principles of Distributed Databases System", Pearson, 2nd Ed., 2009.

REFERENCES:

1. Lin Wujuan, Veeravalli Bhardwaj, "Object Management is Distributed Database Systems", Kluwer Academic Publishes, UK, 2003.
2. V. K. Jain, "Advanced DBMS", Cyber Tech Publications, 2001.
3. Mario Piattini, "Advanced Database Technology and Design", Artech House, UK, 2000.
4. Shivendra Goel, Divya Goel, " Distributed Database Management System", Sun India Publications, 2009.
5. Chhanda Ray, "Distributed Database System", Pearson, 2009.

Code No. MCA 327 **L T C**
Paper: Financial Accounting **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *Any organization that deals with money or money's worth needs to record every transaction that it enters into. The courses in this product give a complete understanding, right from scratch to preparation and analysis of financial statements. Th product is supplemented with a number of interactive exercises, in accordance with the 'learn by doing' approach.*
After completing this course you will be conversant with:

- *Accounting Concepts.*
- *Accounting Equation.*
- *Rules of Accounting.*
- *Recording the transactions.*
- *Adjusting & Rectifying the books.*
- *Preparation of Financial Statements.*
- *Analyzing Financial Statements.*
- *Reconciling the books.*

PRE-REQUISITE:

- Mathematical Concepts

UNIT - I

Meaning and Scope of Accounting: Need for Accounting, Definition and Functions of Accounting, Book Keeping and Accounting, Is Accounting Science or Art? End User of Accounting Information, Accounting and other Disciplines, Role of Accountant, Branches of Accounting, Difference between Management Accounting and Financial Accounting
Meaning of Accounting Principles: Accounting Concepts, Accounting Conventions, Introduction to Accounting Standards, Systems of Book Keeping, Systems of Accounting
Journalising Transactions: Journal, Rules of Debit and Credit, Compound Journal Entry, Opening Entry
Ledger Posting and Trial Balance: Ledger, Posting, Relationship between Journal and Ledger, Rules Regarding Posting, Trial Balance
Sub-Division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Sales Journal, Sales Return Journal
Capital and Revenue: Classification of Income, Classification of Expenditure, Classification of Receipts
Rectification of Errors: Classification of Errors, Location of Errors, Suspense Account, Rectifying Accounting Entries, Effect on Profit **[No. of Hrs: 12]**

UNIT – II

Depreciation Provisions and Reserves: Concept of Depreciation, Causes of Depreciation, Basic Features of Depreciation, Meaning of Depreciation Accounting, Objectives of Providing Depreciation, Fixation of Depreciation Amount, Methods of Recording and Providing Depreciation, AS-6(Revised) Depreciation Accounting
Final Accounts: Manufacturing Account, Trading Account, Profit and Loss Account,
Balance Sheet, Simple Adjustment Entries **[No. of Hrs: 10]**

UNIT – III

Inventory Valuation: Meaning of Inventory, Objectives of Inventory Valuation, Inventory Systems, Methods of Valuation of Inventories

Accounting Standard 2 (Revised): Valuation of Inventories

Accounts of Non-profit Making Organizations: Receipts and Payments Account, Income and Expenditure Account, Balance Sheet, Items Peculiar to Non-trading Concerns **[No. Of Hrs: 10]**

UNIT – IV

Company Final Accounts: Familiarity with the requirements of Schedule VI to the Companies Act 1956, Elementary Knowledge about Items in the Profit & Loss Account and Balance Sheet of a Company, (Preparation of Company Final Accounts not required)

Financial Statements - Analysis and Interpretation: Meaning and Types of Financial Statements, Nature of Financial Statements, Limitations of Financial Statements, Analysis and Interpretation of Financial Statements, Steps involved in Financial Statement Analysis, Ratio Analysis, Classification of Ratios, Profitability Ratios, Turnover Ratios, Financial Ratios, Advantages of Ratio Analysis, Limitations of Ratio Analysis. **[No. of Hrs: 10]**

TEXT BOOKS:

1. Dr. S. N. Maheshwari & Dr. S. K. Maheshwari, "An Introduction to Accountancy", Vikas Publication, 8th Ed. 2003.
2. R. L. Gupta & V.K. Gupta, "Principles and Practice of Accountancy", Sultan Chand & Sons, 1999.

REFERENCES:

1. R. N. Anthony & J. S. Reece "Accounting Principles", Homewood, Illinois, Richard D Irwin, 6TH Ed., 1995.
2. P. K. Ghosh and G. S. Gupta, "Fundamentals of Management Accounting", New Delhi, 1988.
3. Dr. S. N. Maheshwari & Dr. S. K. Maheshwari "Advanced Accountancy", Vikas Publishing House, 8th Ed., 1984.
4. L. E. Heitger and Serge Matulich, "Financial Accounting", New Delhi, McGraw Hill, 1990.
5. B. K. Baneyee, "Financial Accounting - A Dynamic Approach, PHI, 2nd Ed., 2010.
6. P. C. Tulsian, "Financial Accounting", Pearson, 4th Ed., 2009.
7. Charles Horngren, "Principles of Financial & Management Accounting", Englewood Cliffs, New Jersey, 9thEd., 2009.
8. Atkinson, Banker, Kaplam & Young, "Management Accounting", Prentice Hall, 5th Ed. 2009.
9. N.L. Hingorani an A.R. Ramanathan, "Management Accounting", New Delhi, Sultan Chand, 2009

Code No.: MCA 329 **L T C**
Paper: Organizational Behavior & Management Principles **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *Effective management of Human Resources is one of the prerequisites of a successful organization, especially in the present day context of an evolving changing and competitive environment. Organizational effectiveness depends largely on its ability to manage the human behavior. A proper understanding of organizational dynamics and the various management concepts is essential for every manager. The objective of this paper is to provide understanding to the participants in understanding, predicting, and managing people at workplace through motivation, leadership, culture, performance management, career planning & development and stress management. Upon completion of this course, the students should be able to:*

- *Explain and apply principles of organizational behavior and management.*
- *Understanding management and organizational behavior with reference to key organizations in the IT sector- Apple, Intel, Cisco, Infosys, Google, IBM.*
- *Identify individual and organizational practices for managing workplace stress.*
- *Understand group dynamics, and specifically the way individuals within a group work together to attain certain goals.*
- *Understand organizational culture and managing change in organizations.*

PRE-REQUISITE:

- Concept of Formal and Informal Organization Management

UNIT - I

Introduction to OB and Management Principles

Conceptual Framework; Challenges and Opportunities for OB ;Managerial Implications ;Evolution of Management Principles ; Scientific Management Theories ; Taylor and Scientific Management, Fayol's Administrative Management, Bureaucracy, Hawthorne Experiments and Human Relations, Social System Approach ;Management Vs. Administration, Management Skills, Levels of Management, Characteristics of Quality Managers. Evolution of Management: Early contributions.

[No. of Hrs : 12]

Tutorial : [No. of Hrs: 04]
2 Article Review Presentations

UNIT - II

Planning: Types, Process & barriers, Management by Objectives; Organizational context of decisions, Types & process of decision making ; Controlling; Organizing: Concept, Organisation Theories, Forms of Organisational Structure, Combining Jobs: Departmentation, Span of Control, Delegation of Authority, Authority & Responsibility, Staffing: Concept, System Approach, Manpower Planning, Job Design, Recruitment & Selection, Training & Development

[No. of Hrs.; 10]

Tutorial : [No. of Hrs: 41
Case 1: HBS case John Chambers – CISCO's Driving Force.
Case 2 : Larry Ellison - The Source of Oracle Wisdom, HBS case.

UNIT - III

Organizational structure & Design, Organizational Designs; Emerging Design Options Different Organizational Structures; Organizational Culture (creation and sustenance of cultures) , Importance of Culture; Managing Culture; High performance culture, Learning organizations, Orgnaizational climate, Total Quality Management, Techniques of TQM, Re-engineering, Empowerment, Benchmarking, Downsizing, Controlling: Concept, Types of Control, Methods: Pre-control: Concurrent Control: Post-control, An Integrated Control System, Model for Managing Change, Forces for Change, resistance to change,Management of resistance.

[No. of Hrs.; 10]

Tutorial : [No. of Hrs: 04/week]

Case 1 : Case of Infosys (Learning Organisation) ICMR-LDEN003- ECCH-402-017-1

Case 2 : Case of Google culture.

Case 3: Article : Louis Gerstner The Man Who Turned IBM Around' ICMR LDEN007,ECCH-803-018-1 (2003).

Case 4 : Inside Intel Inside HBS-9-502-083 (October 2009).

UNIT - IV

Individual Determinants of organizational, Behaviours; Motivation, Motivation and Performance, Theories Of Motivation, Approaches for Improving Motivation, Pay and Job Performance, Quality of Work Life, Morale Building, Performance Appraisal, Job Anxiety & Stress, Analysing, Interpersonal relations, Group Dynamics, Management of Organizational Conflicts, Management of Change, Leadership Styles & Influence Ethics and leadership.

[No. of Hrs.; 10]

Tutorial : No. of Hrs: 04/week]

Case1 : Apple Inc. HBS (February 29, 2008) Yoggie David B. Sturd Michael ; N9-708-480

Case2: Article Review : Leadership the Bill Gates Way –HBS case. [No. of Hrs: 01]

TEXT BOOKS:

1. Stephen P. Robbins, David & Decenzo, "Fundamentals of Management", Pearson Education, 9th Ed. , 2008.
2. Singh & Chabra, "Organization Theory & Behavior", Educational & Technical Publisher, 2005.
3. T.N. Chhabra, R. K. Chopra and Archana Despande, "Leading Issues in Management & Organizational Behavior (Text & Cases)", Sun India Publications, 2009.
4. Prasad L. M, "Principles of Organizational Behavior and Management", 2001.
5. Robbins, S. P., Judge, T. A. and Sanghi. S, "Organizational Behavior", Pearson, 2009.

REFERENCES:

1. Stoner, et. al., "Management", PHI, 6th Ed., 2002.
2. J. S. Chandan, "Organizational Behavior", Vikas Publishing House, 2004.
3. Joseph W. Weiss, "Organizational Behavior & Change, Managing Diversity, Cross-Cultural Dynamics & Ethics", Vikas Publishing House, 2nd Ed. 2001.
4. Richard Pettinger, "Introduction to Management", Palgrave McMillan , 3rd Ed., 2002.
5. Udai Pareek, "Understanding Organizational Behavior", Oxford University Press 1st Ed., 2004.
6. Fred Luthans, "Organizational Behavior," McGraw Hill International Edition, 9th Ed., 2002.
7. Kavita Singh, "Organization Behavior Text and Cases", Pearson, 2010.

Code No. MCA 331 **L T C**
Paper: Advanced Computer Architecture **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *The objective of this course is to introduce the fundamental techniques on which high-performance computing is based, to develop the foundations for analysing the benefits of design options in computer architecture, and to give some experience of the application of these techniques*. *It should be noted t*hat the use of parallelism is secondary to the objective of achieving high performance.

PRE-REQUISITE :

- Computer Organization

UNIT – I

Parallel computer models: The state of computing , Multiprocessors and multicomputers, Multivector and SIMD computers, Architectural development tracks
Program and network properties: Conditions of parallelism, Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Program flow mechanisms, Control flow versus data flow, Data flow architecture, Demand driven mechanisms, Comparisons of flow mechanisms. **[No. of Hrs.: 10]**

UNIT - II

System Interconnect Architectures: Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.
Processors and Memory Hierarchy: Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors.
Memory Technology: Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology. **[No. of Hrs.: 11]**

UNIT - III

Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, Direct mapping and associative caches.
Pipelining : Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines. **[No. of Hrs.: 11]**

UNIT - IV

Vector Processing Principles: Vector instruction types, Vector-access memory schemes. **Synchronous Parallel Processing:** SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement. **[No. of Hrs.: 10]**

TEXT BOOKS:

1. Kai Hwang, "Advanced computer architecture"; TMH, 2000.
2. M. J. Flynn, "Computer Architecture, Pipelined and Parallel Processor Design", Narosa Publishing, 1998.

REFERENCES:

1. J. P. Hayes, "Computer Architecture and Organization", MGH, 1998.
2. D. A. Patterson, J. L. Hennessy, "Computer Architecture: A Quantitative Approach", Morgan Kauffmann, 2002.
3. Hwang and Briggs, "Computer Architecture and Parallel Processing", MGH.
4. Richard Y. Kain, "Advance Computer Architecture - A System Design Approach", PHI, 1996.

Code No.: MCA 333 **L T C**
Paper: Software Quality Management **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE*: This course covers the issues and techniques related to the Quality Management of software. The course will be helpful for the students and to get acquaint with the industry prespective towards software Quality. The content covers:*

- *Basic Concepts of Software Quality*.
- *Software Quality Assurance.*
- *Formal Technical Reviews.*
- *How it can be implemented.*
- *Describe how to conduct formal technical reviews and why they are the most important SQA activity.*

PRE-REQUISITE:

- Concepts of Software Engineering

UNIT - 1

Concepts and Overview: Concepts of Software Quality, Quality Attributes, Software Quality Control and Software Quality Assurance, Evolution of SQA, Major SQA activities, Major SQA issues, Zero defect Software, Elements of a complete Software Quality System.

Software Quality Assurance: The Philosophy of Assurance, The Meaning of Quality, The Relationship of Assurance to the Software Life-Cycle, SQA Techniques. **[No. of Hrs.: 10]**

UNIT - II

Tailoring the Software Quality Assurance Program: Reviews, Walkthrough, Inspection, and Configuration Audits.

Evaluation: Software Requirements, Preliminary design, Detailed design, Coding and Unit Test, Integration and Testing, System Testing, types of Evaluations.

Testing: Types of testing, Test Planning and conduct, Who does the testing? **[No. of Hrs.: 12]**

UNIT - III

Configuration Management: Configuration Management Components, Maintaining Product Integrity, Change Management, Version Control, Metrics, Configuration Management Planning.

Error Reporting: Identification of Defect, Analysis of Defect, Correction of Defect, Implementation of Correction, Regression Testing, Categorization of Defect, Relationship of Development Phases.

[No. of Hrs.: 10]

UNIT - IV

Defect Analysis: Analyzing concepts, Locating data, Defect Repair and closure, Selecting metrics, Collecting measurements, Quality tools, Implementing defect analysis, Program Unit Complexity.

Corrective Action as to Cause: Identifying the Requirement for Corrective Action, Determining the Action to be Taken, Implementing the Correcting the corrective Action, Periodic Review of Actions Taken.

Traceability, Records, Software Quality Program Planning, Software Quality System Plan, Software Documentation. **[No. of Hrs.: 10]**

TEXT BOOKS:

1. Robert Dunn, "Software Quality Concepts and Plans", Prentice-Hall, 1990.
2. Alan Gillies, "Software Quality, Theory and Management", Chapman and Hall, 1992.
3. John W. Horch , "Practical Guide to Software Quality System", Artech House, 2003.

REFERENCE:

1. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, 3rd Ed., 2008.
2. Daniel Freedman, Gerald Weinberg, "Handbook of Walkthroughs, Inspections and Technical Reviews", Dorset House Publishing, 1990.
3. Tom Gilb, "Principles of Software Engineering Management", Addison-Wesley, 1988.
4. Tom Gilb, Dorothy Graham, "Software Inspection" Addison-Wesley, 1993.
5. Watts Humphrey, "Managing the Software Process", Addison-Wesley, 1990.
6. Watts Humphrey, "A Discipline for Software Engineering", Addison-Wesley, 1995.
7. Arthur Lowell, "Improving Software Quality An Insiders guide to TQM", Wiley & Sons,1993.
8. Mordechai Ben-Menachem, Gary S. Marless,"Software Quality Producing Practical Consistent Software", Cengage Learning, 2nd Ed., 2009.
9. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson, 2nd Ed., 2003.

Code No.: MCA 335 **L T C**
Paper: Digital Signal Processing **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE

This course is an introduction to DSP concepts and implementation. It starts by explaining the need for digital signal processing and DSP systems. A complete model of a DSP system is examined from the input transducer, through all the stages including: signal conditioning, anti-aliasing filter, analog-to-digital and digital-to-analog conversion, output smoothing filter, and output transducer. Correct acquisition of the signal is absolutely necessary for proper use of digital signal processing.

PREREQUISITE

- Digital Electronics
- Operating System

UNIT – I

Discrete time signals and systems, Z-transforms, structures for digital filters, design procedures for FIR and IIR filters. Frequency transformations: linear phase design; DFT. Methods for computing FFT. Noise analysis of digital filters, power spectrum estimation.

Signals and signal Processing: characterization & classification of signals, typical Signal Processing operations, example of typical Signals, typical Signals Processing applications.

Time Domain Representation of Signals & Systems: Discrete Time Signals, Operations on Sequences, the sampling process, Discrete-Time systems, Time-Domain characterization of LTI Discrete-Time systems. **[No. of Hrs: 10]**

UNIT – II

Transform-Domain Representation of Signals: the Discrete-Time Fourier Transform, Discrete Fourier Transform, DFT properties, computation of the DFT of real sequences, Linear Convolution using the DFT. Z-transforms, Inverse z-transform, properties of ztransform, transform domain representations of random signals, FFT.

Transform-Domain Representation of LTI Systems: the frequency response, the transfer function, types of transfer function, minimum-phase and maximum-Phase transfer functions.

[No. of Hrs: 12]

UNIT – III

Digital Processing of continuous-time signals: sampling of continuous signals, analog filter design, anti-aliasing, filter design, sample-and-hold circuits, A/D & D/A converter, reconstruction filter design.

Digital Filter Structure: Block Diagram representation, Signal Flow Graph Representation, Equivalent Structures, FIR Digital Filter Structures, IIR Filter Structures. transfer, modes of data transfer, priority interrupt, direct memory access, input-output processor. **[No. of Hrs: 10]**

UNIT – IV

Digital Filter Design: Impulse invariance method of IIR filter design, Bilinear Transform method of IIR Filter Design, Design of Digital IIR notch filters, FIR filter Design based on truncated fonner sens, FIR filter design based on Frequency Sampling approach. Applications of DSP.

[No. of Hrs: 10]

TEXT BOOKS:

1. Sanjit K. Mitra, “Digital Signal Processing a Computer based approach”, TMH, 2009.
2. Allan Y. Oppenhein & Ronald W. Schater , "Digital Signal Processing”, PHI, 1975.

REFERENCES:

1. Proakis Manodans, “Digital Signal Processing: Principles, Algorithms and Applications”, PHI, 2003.
2. Vijay K. Madisetti, “The Digital Signal Processing Hand Book”, Butterworth- Heinemann, USA, 1999.
3. Vinay K. Ingle, John G. Proaksis, “Digital Signal Processing - A MATLAB Based Approach”, Cengage Learning, 2009.

Practical will be based on following:

1. Linux Programming Lab **MCA 339**
2. Software Testing Lab **MCA 341**
3. Enterprising Lab **MCA 343**
4. Lab based on Elective-I **MCA 345**

Code No. : MCA 361
Paper: General Proficiency – V*

It is suggested to have a fundamental course Intellectual Property Rights (Software Systems Oriented) in this semester.

This paper is under Non University Examination system its detail content will be decided by the respective Institute, under approval of the coordination committee based on the requirement of individual institution.

***Non University Examination Scheme (NUES)**

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.