

PANJAB UNIVERSITY CHANDIGARH- 160 014 (INDIA)

(Estd. under the Panjab Univerasity Act VII of 1947-enacted by the Govt. of India)



FACULTY OF SCIENCE

SYLLABI

FOR

**M.Sc. INFORMATION TECHNOLOGY
(SEMESTER SYSTEM)**

SESSION 2011- 2012

--:O:--

Outlines of Tests, Syllabi and Courses of Reading for M. Sc. (Information Technology) (Two Year Degree Programme) 2011- 2012.

OUTLINES OF TESTS

Paper Code	Paper Name	Theory Lectures	Univ. Exam Marks	Int. Ass. Marks.
------------	------------	-----------------	------------------	------------------

FIRST YEAR (SEMESTER –1)

MS-01	Advance JAVA Programming Language	6	80	20
MS-02	Interactive Computer Graphics	6	80	20
MS-22	Software Engineering & Management	6	80	20
MS-04	Algorithm Design and Analysis	6	80	20
MS-05	Minor Project Based on MS 01	6	80	20
MS-06	Minor Project Based on MS – 02 & MS – 04	6	80	20

FIRST YEAR (SEMESTER –2)

MS-23	Operating System	6	80	20
MS-08	Electronic Commerce and Tools	6	80	20
MS-09	Artificial Intelligence and LISP	6	80	20
MS-28	Trends in Computing	6	80	20
MS-27	Seminar	2	-	50
MS-24	Minor Project Based on MS – 08	6	80	20
MS-25	Minor Project Based on MS – 09	6	80	20

SECOND YEAR (Semester –3)

MS-26	Software Testing and Quality Assurance	6	80	20
MS-12	Visual C++ Programming	6	80	20
MS-13	Linux Administration	6	80	20
MS-14	Systems Approach to Management and Optimization Techniques	6	80	20
MS-18	Seminar	2		50
MS-19	Minor Project Based on MS – 12	6	80	20
MS-20	Minor Project Based on MS – 13	6	80	20

SECOND YEAR (Semester -4)

MS-21	Major Project		400	
-------	---------------	--	-----	--

The project period will be of 6 months duration. The project will involve development of application/system software in industrial/ commercial/ scientific environment.

GUIDELINES FOR SUBMISSION OF PROJECT REPORT (MS-21)

The report should consist of the following :

- Cover page including Project title, Name of the student, Name of the Department and Names of the Project Guides (both External and Internal).
- Acknowledgements.
- Certificates from company and department duly signed by external guide, Principal and internal guide.
- Contents with page numbers.
- Introduction (includes background and application or importance of the project)
- Objectives
- System Analysis

System Feasibility study

- Software requirement specifications
- Design with system flowcharts and input/output design.
- Implementation and Testing
 - Hardware and software used
 - Listing of well commented programs with result/output or detailed algorithms with input and output.

Further scope of the project

- Bibliography
- Appendices (any other information related to project)

Each student should observe the following norms while submitting the synopsis/thesis for the Project :

- (a) Use both sides of the paper instead of only single side.
- (b) Use one and half interline spacing in the text (instead of double space)
- (c) Stop using a blank sheet before the page, carrying figure or table.
- (d) Try to insert figure/table in the text page itself (instead of using a fresh page for it, each time.)

Students must consult/inform the internal guides regarding the progress of their work at least once in 20 days. It is the duty of the student to be in touch with his internal guide. The student must prepare 5 copies of the report including one copy for self. The remaining four are to be submitted before 31st May every year as per the following :

1. Main Library
2. Department Library
3. Internal Guide
4. Company

One softcopy of the work is to be submitted to the concerned head of the department/institution along with the report. The student must present his/ her work in 15 minutes mainly focusing on his/her contribution with the help of slides followed by demonstration of the practical work done. The project Viva will be completed before 15th June every year Exact dates will be informed before 31st May every year.

An external examiner, internal examiner and the internal guide will conduct project viva.

FIRST -SEMESTER

Objectives: After completing this course, they

- 1) Can become entrepreneurs
- 2) Can go for higher studies
- 3) Can be employed in middle level industry sector both of IT and general

Paper Code : MS – 01

Paper Title : Advanced JAVA Programming Language.

Maximum Marks : 80

Number of Lectures : 90
(45 minutes duration)

L P
6 8

Objectives : This course enables students to learn advanced features of JAVA such as JDBC and Swings.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION - A

1. Review of Java Basics : Features, environment, class, inheritance, package, interface, applets, AWT, exception handling, multithreading, files.
2. Swing : Features, components, swing vs AWT, swing containers, controls, using Dialogs, sliders, progress bars, tables, creating user interface using swing.
(No. of Lectures : 22)

SECTION - B

3. Java Database Connectivity : Connectivity model, Java. SQL package, JDBC Exception classes, Database connectivity, Data manipulation and navigation.
4. Java RMI : Distributed object technologies, RMI architecture, creating RMI applications.
(No. of Lectures : 23)

SECTION - C

5. Java Servlets : Servlets vs CGI, Servlet lifecycle, creating and running servlets.
6. Networking : Networking basics, Java and the Net, TCP/IP client sockets, TCP/IP server sockets, Inet Address, URL, Datagrams, creating networking applications.
(No. of Lectures : 22)

SECTION - D

7. Java Beans : Component architecture, what are Beans, Advantages of Beans, Bean Developer kit (BDK), JAR files, introspection, developing Beans, Using Bound properties, The Java Beans API.

(No. of Lectures : 23)

REFERENCES :

1.	Bayross. Ivan, 2003	:	Web Enabled commercial Application Development using Java 2.0, BPB.
2.	Schildt, Herbert, 1998	:	The complete Reference Java 2, TMH
3.	Keogh, James, 2002	:	J2EE: The complete Reference.
4.	Tata McGraw-Hill, 2001	:	INSTANT ENTERPRISE JAVABEANS.

Paper Code : MS - 02

Paper Title : Interactive Computer Graphics

Maximum Marks : 80

**Number of Lectures : 90
(45 minutes duration)**

**L P
6 4**

Objectives : This course enables students to understand graphics hardware and various 2D and 3D algorithms.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION - A

1. Display Devices : Line and point plotting systems; Raster, vector, pixel and point plotters, Continual refresh and storage displays, Digital frame buffer, Plasma panel displays, Very high resolution devices, High - speed drawing, Display processors, Character generators, Color - display techniques (shadow mask and penetration CRT, color look-up tables, analog false colors, hard-copy color printers). Display Discription; Screen coordinates, user co-ordinates; Graphical data structures (compressed incremental list, vector list, use of homogeneous coordinates); Display code generation; Graphical functions;

(No. of Lectures : 22)

SECTION - B

2. The view algorithm, Two - dimensional transformation, Line-drawing, Circle drawing algorithms.
3. Interactive Graphics : Pointing and positioning devices (cursor, lightpen, digitizing tablet, the mouse, track balls), Interactive graphical techniques;

Positioning, (Elastic or Rubber Band lines, Inking, zooming, panning, clipping, windowing, scissoring),

(No. of Lectures : 23)

SECTION - C

4. Mouse Programming, Turbo-C, Graphic Languages : Primitives (Constants, actions, operators, variables), plotting and geometric transformations, display subroutines, Concept of Animation, Saving, Loading and Printing graphics images from/to disk. Animated algorithms for Sorting, Towers of Hanoi etc.

(No. of Lectures : 22)

SECTION - D

5. 3-D Graphics: Wire-frame, perspective display, Perspective depth, Projective transformations, Hidden line and surface elimination, Transparent solids, Shading.
6. Programming Projects: Two dimensional Transformations, 3-dimensional transformations, Interactive Graphical Techniques. GUI.. Turbo C/C++ (Graphics Routines) is to be used as the standard teaching tool.

(No. of Lectures : 23)

REFERENCES :

1.	Giloi, W.K., 1978	:	Interactive Computer Graphics; Prentice-Hall
2.	Newman, W., Sproul, R.F., 1980	:	Principles of Interactive Computer Graphics, McGraw- Hill.
3.	Rogers, D.F., 1985	:	Procedural Elements for Computer Graphics, McGraw-Hill.
4.	Harrington, S., 1983	:	Computer Graphics : A Programming Approach, Tata McGraw-Hill.
5.	Foley, J.D., Van Dam A., 1982	:	Fundamentals of Interactive Computer Graphics, Addison-Wesley.
6.	Hearn, D., Baker P.M, 1986	:	Computer Graphics, Prentice-Hall.
7.	Tosijas, L.K., 1983	:	Computer Graphics, Springer-Verlag.
8.	Kelley Bootle, 1989	:	Mastering Turbo C.
9.	Roy, Plastock, 1986	:	Theory & Problems of Computer Graphics, Schaum Series

Paper Code : MS - 22

Paper Title : Software Engineering & Management

Maximum Marks : 80

**Number of Lectures : 90
(45 minutes duration)**

L	P
6	--

Objectives : This course enables students to understand Software Configuration Managements Tools and Techniques.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

Prerequisite: Computer Organisation & Assembly Language Programming, problem Solving and C-Programming.

SECTION – A

1. Introduction: Software Engineering goals, Characteristics of well-engineered software, Software process Models: Waterfall, Prototyping, Spiral, Fourth Generation Techniques, S/w Inspection, Communication skills for Software Engineer, Preview and Inspection Procedures, Composition of inspection team, Checklist, Human factors in Software Engineering.
2. Software Specifications: Software requirements, Definition, Software requirements specifications (SRS), Components of SRS.

(No. of Lectures : 22)

SECTION – B

3. Software Project Planning & Scheduling : Objectives, Decomposition techniques, Problem based estimation, Cost estimation models, COCOMO model, Risk in estimation.
4. System Analysis : Principles of structures Analysis, DFD, E-R-diagram, Data Dictionary

(No. of Lectures : 23)

SECTION – C

5. Software Metrics: Role of Metrics and Measurements, Types of Software Metrics.
6. Software design: Objectives, Principles, Concepts, Design Process, Design Methodologies, Structured design, Modular design, Object oriented design, User-interface design, Features of a Modern GUI, Windows, icons, error messages etc.

(No. of Lectures : 22)

SECTION – D

7. System Administration and Training : User manual, Implementation, Documentation, Operation plan and Maintenance.

8. Hardware and Software Selection : Hardware acquisition, Benchmarking, Vendor selection, Software selection, Performance and acceptance criteria, Site preparation.
(No. of Lectures : 23)

SUGGESTED READINGS

1.	Fairley,R.E., 1985	:	Software Engineering concepts,McCraw-Will.
2.	Lewis,T.G., 1982	:	Software Engineering ,McCraw-Hill.
3.	Meyers, G., 1979	:	The art of Software Testing, Wiley-Inter-Science.
4.	Hibbard, 1978	:	Constructing Quality Software
5.	Shere, 1988	:	Software Engineering & Management, Prentice_Hall.
6.	Deutsch, Willis, 1989	:	Software Quality Engineering; A Total Technical and Management Approach, Prentice- Hall.
7.	Sommerville, I., 1986	:	Software Engineering, Narosa Publ. House
8.	Doug Bell, Ian Murrey, John Pugh, 1992	:	Software Engineering A Programming Approach Prentice Hall.
9.	Pressman, 2010	:	Software Engineering.
10.	Ghazzi,Carlo, 1995	:	Fundamentals of Software Enggining, PHI.
11.	Jalota,Pankaj, 1995	:	An integrated approach to Software Enggineering,Narosa Publ.

Paper Code : MS - 04

Paper Title : Algorithm Design and Analysis

Maximum Marks : 80

Number of Lectures : 90

(45 minutes duration)

L	P
6	4

Objectives : The course enables students to understand different algorithmic techniques and their analysis.

Note :

- The Question Paper will consist of Four Sections.
- Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- The students are required to attempt **ONE** question from each Section and the Compulsory question.
- All questions carry equal marks unless specified.

SECTION - A

- Review of Algorithms and Data Structures** : Analysing algorithms; Stacks and Queues, Trees, Heaps and Heap sort; Sets, Find and Disjoint set union, Graphs,

Hashing. Example of recursive programs; Converting recursive algorithms into iterative ones; Analysing algorithms; Big Oh and Asymptotic notations.

- 2. Divide and Conquer** : General method, Binary Search, Merge sort, Quick sort, Selection sort, Strassen's matrix multiplication and analysis of these problems.
(No. of Lectures – 22)

SECTION - B

- 3. Greedy Method** : General Method, Knapsack problem, Job sequencing with dead lines, Minimum spanning Trees, Single source Shortest path; analysis of these problems.
- 4. Dynamic Programming** : General method, Optimal Binary Search Trees, 0/1 Knapsack, the travelling Salesperson problem.
(No. of Lectures – 23)

SECTION - C

- 5. Backtracking** : General method, 8 queen's problem, Graph colouring, Hamiltonian cycles.
- 6. Branch-And-Bound** : Method, 0/1 Knapsack and Travelling Salesperson problems, Efficiency considerations.
(No. of Lectures – 22)

SECTION - D

- 7. Lower-Bound Theory** : Techniques for Algebraic problems, Some Lower Bounds on parallel Computation.
- 8. NP-hard and NP-complete problems** : Basic concepts, Statement of Cook's Theorem, Examples of NP-hard graph and NP-scheduling problems, some simplified NP-hard problems.
(No. of Lectures – 23)

REFERENCES :

1.	Horowitz, Ellis and Sahni Sartaj, 1978	:	Fundamentals of Computer Algorithms; Galgotia Publications.
2.	Aho A.V., Hopcroft J.E., Ullman J.D., 1974	:	The Design and Analysis of Computer Algorithms; Addison-Wesley.
3.	Berlionx, P., Bizard, P., 1986	:	Algorithms - The Construction, Proof and Analysis of Programs; John Wiley & Sons.
4.	Bentley, J.L., 1982	:	Writing efficient programs; Prentice-Hall India, Eastern Economy Edition.
5.	Goodman, S.E. & Hedetniemi, 1977.	:	Introduction to the Design and Analysis of Algorithms; McGraw-Hill Book Comp.
6.	Knuth, D. E. 1985.	:	Fundamental of Algorithms ; The Art of Computer Programming Vol.-1, Naresh Publ. House

SECOND SEMESTER

Paper Code : MS - 23

Paper Title : Operating System

Maximum Marks : 80

Number of Lectures : 90

(45 minutes duration)

L P
6 8

Objectives : To understand the concepts of Operating System including dealing with deadlocks & file management.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION – A

1. Introduction to Operating System : OS, types of OS, Functions/Operations of OS, History of OS, Users services/jobs.
2. Memory Management (I) : Address protection, segmentation, virtual memory, paging, page replacement algorithms,
(No. of Lectures : 22)

SECTION – B

3. Memory Management (II) : cache memory, hierarchy of memory types, associative memory.
4. Support for concurrent process : Mutual exclusion, shared data, critical sections, busy form of waiting, lock and unlock primitives, synchronization.
(No. of Lectures : 23)

SECTION – C

5. Scheduling : Process states, virtual processors, interrupt mechanism, scheduling algorithms- preemptive and non- preemptive scheduling.
(No. of Lectures : 22)

SECTION – D

6. System deadlock : Prevention, detection and avoidance.
7. Multiprogramming system : Queue management, File and directory systems, disk scheduling.
(No. of Lectures : 23)

SUGGESTED READINGS

1.	Bach, M., 1986	:	Design of the UNIX operating systems.
2.	Peterson, James. L. and Silberschatz, A, 1985	:	Operating System Concepts, Addison-Wesley, Publ. Comp.
3.	Deitel, H.M., 1984	:	An Introduction to Operating System, Addison-Wesley Publ. Comp.
4.	Milenkovic, M., 1987	:	Operating System - Concepts and Design, McGraw-Hill International Editions.
5.	Richie, C. 2001	:	Operating System
6.	Hansen Per Brineh, 1978	:	Operating System Principles, Prentice-Hall India.
7.	Madnick and Donovan, 1978	:	Operating System, McGraw-Hill Book Comparison.

Paper Code : MS - 08

Paper Title : Electronic Commerce and Tools

Maximum Marks : 80

Number of Lectures : 90

(45 minutes duration)

L	P
6	4

Objectives : This course enables students to know fundamentals of Electronic Commerce applications and issues.

Note :

- The Question Paper will consist of Four Sections.
- Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- The students are required to attempt **ONE** question from each Section and the Compulsory question.
- All questions carry equal marks unless specified.

SECTION - A

- Electronic Commerce Fundamentals:** Introduction to E-commerce and its advantages & disadvantages; Traditional vs E-Commerce; Growth of E-Commerce in India vis-à-vis Other Nations; Prospects and limitations in the growth of E-commerce in Indian context; E-Commerce Framework; The anatomy of E-commerce Applications; E-commerce consumer & organization applications.

(No. of Lectures : 22)

SECTION - B

- Internet as a Network infrastructure for E-commerce; Architecture and components of Internet; Internet Services; ISPs at Local/National/Global Level; Domain Name Registration; Internet Administration; Internet Protocol Suite. Architectural Framework for E-Commerce; WWW as the architecture; Hypertext Publishing; Technology behind the web; Security behind the web.

(No. of Lectures : 23)

SECTION - C

3. Consumer oriented applications; Mercantile Process Model; Mercantile Model from the Consumer's perspective; Mercantile Model from the Merchant's perspective. Electronic Data Interchange(EDI) and its applications in business; Legal, Security and Privacy issues in EDI; EDI software implementation; Internal Information Systems; ERP and Supply-Chain Management; The corporate digital library; Advertising and marketing on the internet; On-demand education and Digital copyrights.

(No. of Lectures : 22)

SECTION - D

4. **Issues in E-commerce:** The legal and policy environment of E-Commerce; Intellectual Property, advertising and consumer protection; Copyright Law; Patent Law; Network Security and Firewalls; Client-Server Network Security Threats; Data and Message Security; Encrypted Documents and E-mail; Principles of digital cryptography; Symmetric and Asymmetric Cryptosystems; Cryptographic standards e.g. Data Encryption Standard(DES); Digital Signatures; Public Key Certificates;

(No. of Lectures : 23)

REFERENCES

1.	KalaKota, Ravi & Whinston, Andrew B., 1986	:	Frontiers of Electronic Commerce; Addison Wesley.
2.	Bajaj, Kamlesh & Nag, Debjani, 2000	:	E-Commerce-The Cutting Edge of Business; Tata McGraw- Hill.
3.	Minoli, Daniel & Minoli, Emma, 1999	:	Web Commerce Technology Handbook; Tata McGraw Hill.
4.	Kosiur, David, 1997	:	Understanding E-Commerce; Microsoft Press.

Paper Code : MS - 09

Paper Title : Artificial Intelligence and LISP.

Maximum Marks : 80

Number of Lectures : 90

(45 minutes duration)

L P
6 4

Objectives : The course enables students to understand Artificial Intelligence techniques and also enables to learn the Artificial Intelligence Language LISP.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION - A

1. **Artificial Intelligence (AI)** : Introduction and Applications : History of AI from Alan Turing and developments in AI, AI techniques, Criteria for success. Problem Solving Concepts and Methods .
2. **State space representation**, Problem Characteristics, Breadth -first Search and Depth-First Search methods, Heuristic Search Techniques - Hill Climbing, Best first Search, A*, Problem reduction, Ao*, Constraint satisfaction and means-ends analysis techniques.

(No. of Lectures : 22)

SECTION - B

3. **Knowledge Representation** : Information and Knowledge, Knowledge Acquisition and Manipulation, Issues in knowledge representation, Knowledge Representation Methods, Propositional Logic and First Order Predicate Logic, Resolution Principle, Horn's Clauses, Semantic networks, Partitioned Semantic Nets, Frames, Scripts and Conceptual Dependencies.
4. **Gameplaying**: Minimax Search Procedure, Adding Alpha-Beta Cutoffs

(No. of Lectures : 23)

SECTION - C

5. **Expert Systems** : Definition and Applications, Characteristics of Expert Systems, Architecture of a typical expert system, Expert system Shells, Building an Expert System, Knowledge Acquisition, Case studies of Expert Systems like MYCIN. Specific Application of AI.
6. **Natural Language understanding** and Processing: Complexity of the problem, Syntactic processing, Semantic Analysis, Pragmatic processing, Introduction to Perception and Action.

(No. of Lectures : 22)

SECTION - D

7. **Introduction to LISP** : Symbolic expressions, creating, Appending and modifying lists, Defining functions, Predicates, Conditionals, Recursion, Iteration, Lambda Expressions, Use of Advanced functions like MAPCAR, REMOVE-IF, COUNT-IF.

(No. of Lectures : 23)

REFERENCES :

1.	Rich Elaine and Knight Kevin, 1991	:	Artificial Intelligence, second edition; Tata-McGraw Hill Company, New Delhi.
2.	Russel, Sturat; & Norviig, Peter, 2007	:	Artificial Intelligence; a modern Approach published by Person Education (Singapore) Pvt. Ltd. Indian Branch, 482 F.I.E. Patparganj, Delhi - 110092, India.
3.	George F Luger; William A. Stubblefield, 2009	:	Artificial Intelligence; Structures and Strategies for Complex problem solving, Second edition.
4.	Winston,P.H.and Horn,B.K.P., 1993.	:	LISP 3 rd Edition; Addison-Wesley pub. Co., New York..
5.	Sangal,Rajeev, 1995	:	LISP Programming; Tata McGraw Hill pub. Co. Ltd., New Delhi.
6.	Balaguruswami, 1994	:	Artificial Intelligence & Technology.
7.	Bharti & Chaitany, 2005	:	Natural Language Processing, PHI.
8.	Patterson, Dan W., 1995.	:	Introduction to Artificial Intelligence and Expert Systems; Prentice-Hall of India Pvt. Ltd., New Delhi, Ivan : Introduction to Prolog.

Paper Code : MS - 28
Paper Title : Trends in Computing
Maximum Marks : 80

Number of Lectures : 90
(45 minutes duration)

L	P
6	--

Objectives : This course enables students to be familiar with emerging technologies as Parallel Computing, Mobile Computing and intelligent Agent Technologies.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION - A

1. Parallel Computing : Parallel virtual machine(PVM) and message passing interface (MPI) libraries and calls. Advanced architectures. Today's fastest computers and Supercomputers.
2. Data compression technology: Introduction, space/storage compression, Lossy versus lossless data compression, Graphics Metafiles, Classes of data encoding techniques, GIF, PNG, JPEG and MPEG compressions

(No. of Lectures : 22)

SECTION - B

3. Data Warehousing and data mining : characteristics of data warehousing, data modeling for data warehousing, steps to build a data warehouse, Applications of data mining, Association rules, classification, sequential patterns, clustering etc., commercial data mining tools

(No. of Lectures : 23)

SECTION - C

4. Mobile Computing : Mobile connectivity-Cells, Framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications. Mobile databases-protocols, scope, tools and technology. M-Business.
5. Intelligent Agent Technology : Introduction to agents, Intelligent software systems, applications, Intelligent architectures, components of intelligent agent based distributed systems, agent communication protocols - introduction to knowledge query and manipulation language (KQML). Case Study-Road Traffic Management System.

(No. of Lectures : 22)

SECTION - D

6. .NET – evolution : Need and perspective in current scenario, .net framework over view structural diagram. XML : An overview of XML, use of XML, integrity of XML with databases, XML as the .NET Meta language

(No. of Lectures : 23)

REFERENCES :

1.	M. Sasikumar, Dinesh Shikhare, P. Ravi Prakash, 2004	:	Introduction to Parallel Processing, PHI. (for section A)
2.	Barry Wilkinson, Michael Allen, Parallel Programming, 2006	:	Techniques and Applications Using Networked Workstations and Parallel Computers, Pearson Education Asia. (Section A)
3.	Elmasri & Navathe, 2008	:	Fundamentals of database Systems By Introducing Microsoft .Net, 3 rd Edition by Platt, PHI
4.	Andy Dorman, 2001	:	The Essential Guide to Wireless Applications, Addison Wesley Longman (Singapore) Pvt. Ltd.; (for section B)
5.	Rahul Bannerjee, 2003	:	Internetworking Technologies: An Engineering perspective, PHI, 2003.(Chapters- 3 & 4) (for sections C & D)
6.	Gerhard Weiss, 1999	:	Multiagent Systems : A Modern Approach to Distributed Artificial Intelligence, Edited The MIT Press, LONDON. (Chapter – 1,2,9 & 10). (For Section D).

THIRD SEMESTER

Paper Code : MS - 26

Paper Title : Software Testing and Quality Assurance

Maximum Marks : 80

Number of Lectures : 90

(45 minutes duration)

L P

Objective: This course enable students to learn software testing process and tech. basics of concepts of Quality Assurance reliability & Conf. Management.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION – A

1. An overview of Testing Process: Software Testing, Objectives of Software Testing, Software Testing Process, Static and Dynamic Analysis, STEP Methodology, Elements of STEP and STEP Architecture.
2. Metrics for Software: Importance of Metrics to Software Project, Software Quality Metrics, Software Metrics: Product Metrics: Software Size Metrics, Control Complexity Metrics, Object-Oriented Metrics, Software Quality Metrics.

(No. of Lectures : 22)

SECTION – B

3. Software Testing Techniques: BBT & its Technique, Boundary Value Analysis, Cause-Effect Graph, white-Box Testing and its Techniques: Domain and Boundary Testing, Logic Based Testing, Data Flow Testing.
4. Software Testing Strategies: Characteristics, Integration Testing, Functional Testing, Object Oriented Testing, Alpha and Beta Testing, Overview of Testing Tools

(No. of Lectures : 23)

SECTION – C

5. Quality Assurance: Overview of Software Quality, Software Quality Attributes, Factors Affecting Software Quality, Building Software Quality Assurance Plan, Components of SQAP.
6. Quality Management & Quality Models: Software Quality System, Quality Management Principles, Essence of International Standards, ISO 9000 Quality Standard, SEI Capability Maturity Model.

(No. of Lectures : 22)

SECTION – D

7. Software Reliability: Factors Affecting Software Reliability, Software Reliability VS Hardware Reliability, Software Reliability Metrics.
8. System Configuration Management (SCM): Basic requirements for SCM system, SCM principles, Planning and organizing for SCM, Benefits of SCM, Change management, Version and release management.

(No. of Lectures : 23)

Reference :

1.	Doutsch, Wills, Hall, 1988	:	Software Quality Engineering: A total Technique and management Approach,
2.	Gill, Nasib Singh	:	Software Engineering: Softwrae reliability, Testing and Quality Assurance. Khanna book publishing.
3.	Rick D Craig and Stefan P. Jaskiel, 2002	:	Systemetic Software Testing: Artech House Publishers.
4.	Robert T. Futrell, Donald F. Snafer, Linda I. Shafter, 2002	:	Quality Software Project Management Pearson Education.
5.	William E. Perry, WILEY, 2006	:	Effective methods for Software Testing:

1.

Paper Code : MS - 12

Paper Title : Visual C++ Programming

Maximum Marks : 80

Number of Lectures : 90

(45 minutes duration)

L P

Objective: This course enables students to learn various features of VC++ program, db creation & app. Deployment.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION – A

1. Introduction to Developer Studio. Developer Studio wizards, Using AppWizard, Creating a basic application, Resource editors, The Gallery and the InfoViewer, The debugging environment.
2. Visual C++ Programming
Visual C++ 's Program Structure, Variables, data-types, basic I/O, selection statements, repetition statements, arrays, pointers, dynamic memory allocation, functions, recursion,

Visual C++ library of functions, inheritance, polymorphism, virtual functions, storing data in disk files, using disk files.

(No. of Periods : 22)

SECTION - B

3. Win32 architecture and the Windows GUI
The Win32 API, Architecture of a Win32 program, Elements of Windows GUI.
4. Windows Programming with MFC
MFC fundamentals: The structure and usage of the MFC, The application framework, MFC support for multithreading, MFC class categories, The document/view architecture, Handling window messages, Managing handlers with ClassWizard, Errors and error handling, MFC diagnostic functions and macros, Exceptions and exception handling.

(No. of Periods : 23)

SECTION – C

5. MFC and user interface programming: MFC classes and user interface elements, Commands and menus, Toolbars, Dialog bars and status bars, Creating dialog boxes, Standard windows controls and MFC classes, Dialog Data Exchange (DDX) and Dialog Data Validation (DDV), Using list boxes, Building an ActiveX control framework, MFC support for Context-sensitive help.

Viewing and Storing Data: Form views, Control views, Splitter windows, Handling multiple views.

(No. of Lectures : 22)

SECTION - D

6. Database Creation Programming in Windows
Data access with MFC: Introduction to data access, MFC database classes, Recordsets and transactions.
Developing database applications: Creating an ODBC application, Structure of a database application, Connecting the recordset to controls, Creating a joined recordset.
Querying the database: Customizing a query, Querydefs and parameterized, queries, Seek and Find functions.
7. Application Deployment
The Registry and application setup, Linking, MFC and DLLs.

(No. of Lectures : 23)

REFERENCES

1.	Horton, Ivor, 1998	:	Beginning Visual C++ 6, Wrox Press Ltd, 1998.
2.	Kanetkar, Yashwant, 1998	:	Visual C++ Programming, BPB.
3.	Kanetkar, Yashwant, 1999	:	Visual C++ Projects, BPB.
4.	Holzner, Steven, 1997	:	Visual C++ 5, BPB
5.	Young, Michael, 1998	:	Mastering Visual C++, BPB.

Paper Code : MS - 13
Paper Title : Linux Administration
Maximum Marks : 80

Number of Lectures : 90
(45 minutes duration)

L P

Objective: This course enables students to get familiar with Linux system, its commands, file & dir. system, shell program PERL prog and system admn.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION – A

- 1. Introduction to Linux :** What is Linux, Linux's History, Minimum System Requirements; Installing Linux : Working with Linux, Floppy-less Installation, Boot and Root Disks, Choosing Text or Graphics Installation, Setting up your Hard Drive, Formatting the Partitions, Setting up the Ethernet, Configuration X, Selecting packages to Install, Using LILO; Partitioning the Hard Disk : Linux Swap Space Partitions, Linux's fdisk, Enabling the Swap Space for Installation, Creating the Linux File-system partition, Using LILO
- 2. Using Linux :** Starting and Stopping your Linux System, Linux Shutdown Commands, Login, Passwords, Creating a New Login, Logging Out; Trying out your new Login : Linux Error Messages, Search Paths; The who Command, Commands and Programs.
- 3. Basic Linux Commands :** How Linux Commands Work, Command Options, Other Parameters, Input and Output Redirection, National conventions used to Describe Linux commands, Online help available in Linux, The Linux Man pages, Finding keywords in Man pages, The bash shell help facility; Wildcards : * and ?, Environment Variables, Process and How to Terminate them, The process status Commands : ps, The process termination command : kill, the su command, the grep command.

(No. of Periods : 22)

SECTION - B

- 4. Using the File System :** Files Overview, Common types of files, filenames, Directories an Overview, Parent directories and sub-directories, The root directory, How directories are named, The home directory; Navigating the Linux file System : pwd command, Absolute and relative filenames; cd command, Creating and Deleting files : Cat, Creating Directories, Moving and Copying files, Moving and Copying with Wildcards, Moving Directories, Removing files and directories, Fear of Compression: The Zipless file, Important directories in the Linux file System : / , /home, /bin, /usr, /usr/bin, /usr/spool, /dev, /usr/bin, /sbin, /etc.
- 5. File and Directory Permissions :** File and Directory ownership, User and ownership, Groups, Changing group ownership, File Permissions, UMASK Setting, Changing File Permission, Changing directory permissions; Bash : What is Shell ? How the Shell gets Started, The most common Shells; The Bourne Shell: Command-line Completion,

Wildcards, Command History, Aliases, Input Redirection, Output Redirection, Pipelines Shell, Prompts, Job control, Customizing bash, bash commands, bash variables.

(No. of Periods : 23)

SECTION - C

6. **Linux - tcsh** : An Introduction to tcsh, Command completion, Wildcards, Command History, Aliases, Input and Output Redirection, Pipelines, Prompts, Job Control; Key Bindings, Correcting Spelling Errors, Pre-commands, Change directory Commands, Monitoring Logins and Logouts, Customizing tcsh, tcsh Command Summary, tcsh variables.
7. **Shell Programming** : Creating and Running Shell Programs, Using variables : Assigning a value to a variable, Accessing the value of a variable, Positional Parameters and other Built-In Shell Variables; The Importance of Quotation Marks : The test Command, The tcsh Equivalent of the test command, Conditional Statements : if Statement , case Statement; Iteration Statements : for Statement, while Statement, until Statement, shift Command, select Statement, repeat Statement, Functions.
8. **Editing and Typesetting** : Text Editors vi, The vi Editor, Starting vi, vi modes, Inserting Text, Quitting vi, Moving the Cursor, Deleting Text, Copying and Moving Text, Searching and Replacing Text, Setting Preferences.

(No. of Periods : 22)

SECTION - D

9. **PERL** : Creating and Executing Perl Programs, Handling Data in Perl: Variables, Numbers, Strings, File Operators: Arrays, Perl Programming Constructs : Statement Blocks, If Statements, unless Statements, for Statements, for each Statements, while Statements, until Statements, Functions : Passing Arguments to Functions, Using Return Values; Perl Operators.
10. **Linux for System Administrators** : System Administration Basics, The root Account, Starting and Stopping the System, Booting from a Floppy, Using LILO to Boot, Shutting Down Linux; Mounting File Systems : Mounting a Floppy, Creating a New file System, Un-mounting file Systems, Checking file Systems, Using a file as Swap Space; Compressing files with gzip and compress : Using tar, Backups, Setting up your System : Setting the System Name, Using a Maintenance Disk, Forgetting the root Password, Setting the Login Message.
11. **Networking & Network Services** : What is TCP/IP ? Hardware Requirements, Configuring Linux Files, Setting up the Dummy Interface, Configuration Files, Testing and Troubleshooting, The netstat Command, ping, Mail, News, NFS, NIS, www, FTP, DNS.

(No. of Periods : 23)

REFERENCES :

1.	Tim Parker, 1999	:	Linux Unleashed Third Edition, Techmedia.
2.	Tackett, J., 2000	:	Special Edition using LINUX, PHI.
3.	Norton, P., 2000	:	Complete guide to LINUX, Techmedia.
4.	Komarinski, M., 1998	:	LINUX System Administration Handbook, AW.

Paper Code : MS - 14

Paper Title : Systems Approach to Management and Optimization Techniques

Maximum Marks : 80

Number of Lectures : 90

(45 minutes duration)

L P

Objective: This course enables students to be familiar with different types of Info systems, basics of DR and its practical problems.

Note :

- i. The Question Paper will consist of Four Sections.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

SECTION - A

1. Concepts of Computer Based Systems:

Data, Information, Information Systems, Model of computer based information system; Introduction to Management Information System, Decision Support System and Knowledge Based Systems

2. Accounting Information System:

Characteristics, sample system, subsystems for filling customer order, order replenishment stock, performing general ledger processes; features and use of Accounting Information System Package-Tally.

3. Marketing Information System:

Basic concepts, model, subsystems including Marketing Research, Marketing Intelligence, Product, Place, Promotion and Pricing subsystems

(No. of Lectures : 22)

SECTION - B

4. Manufacturing Information System:

Model and subsystems including Accounting Information, Industrial Engineering, Inventory, Quality and Cost Subsystems

5. Financial Information System:

Model and Subsystems including Forecasting, Funds Management and Control Subsystems.

6. Human Resources Information Systems:

Model and Subsystems including human resources research, human resources intelligence, HRIS Database, HRIS output

(No. of periods: 23)

SECTION – C

- 7 **Basics of Operations Research (OR):**
Origin and Development of OR, Characteristics of OR, Models in OR, OR and Decision Making, Role of Computers in OR, Limitations of OR
- 8 **Linear Programming:** Mathematical Formulation, Graphical and Simplex method, Duality in Linear programming, Dual Simplex Method, The Revised Simplex Method, Sensitivity Analysis.
- (No. of Lectures : 22)

SECTION - D

- 9 **Special types of Linear Programming problems** –Transportation and Assignment problems.
10. **Integer Programming:** Introduction, Branch and Bound Techniques, Binary Linear Programming, Assignment & Traveling salesman problems.
11. **Dynamic Programming,** Deterministic & Probabilistic Dynamic Programming
- (No. of Lectures : 23)

REFERENCES

1.	Basandra, Suresh K.	:	Computer Systems Today, Wheeler Publishing
2	Murdick, R.G. & Ross J.E. & Claggtt J.R., 1984	:	Information Systems for Modern Management, Prentice Hall
3	Swarup, Kanti, Gupta, P.K. & Manmohan, 1994.	:	Operations Research, Sultan Chand & Sons 7 th ed.
4.	Gupta, Prem Kumar & Hira, D.S. , 1999	:	Operations Research.
5.	Rao, S. S., 1978	:	Introduction to Optimization: Theory & Applications, Wiley Eastern
