

Department of Distance Education
Punjabi University, Patiala
Syllabus
M.Sc. (IT) Second Year
(Annual)
Session:- 2020-21

	Univ. Exam Marks	Int. Ass. Marks
MS(A)-211 Web Technology	80	20
MS(A)-212 Java Programming	80	20
MS(A)-213 Software Engineering	80	20
MS(A)-214 Computer Networks	80	20
MS(A)-215 Programming Lab-IV	60	40
MS(A)-216 Programming Lab-V	60	40
MS(A)-221 Computer Graphics	80	20
MS(A)-222 Linux Administration	80	20
MS(A)-223 Modern Information Systems	80	20
MS(A)-224 Artificial Intelligence System	80	20
MS(A)-225 Programming Lab – VI	60	40
MS(A)-226 Programming Lab – VII	60	40
Total	880	320

The Candidate's who get admission through lateral Entry in M.Sc. (IT) Part II after passing PGDCA Examination will have to pass the following deficient papers of M.Sc. (IT) Part I :-

MS(A)-113 Computer Organization & Architecture
MS(A)-114 Mathematical Foundation of Computer Science
MS(A)-121 Object Oriented programming Using C++
MS(A)-122 Data & File Structures
MS(A)-123 Visual Basic
MS(A)-125 Programming Lab-II

INTERNAL ASSESSMENT:

- i. 90% marks would be awarded on the basis of the internal test conducted during 2nd PCP.
- ii. 10% marks would be awarded on the basis of attendance of both PCP's

MS(A)-211 : Web Technology**Maximum Marks: 80****Maximum Time: 3 Hrs.****Minimum Pass Marks: 35%****A) INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introductory: Internet Basics: Networks, Protocols, TCP/IP, Internet Addresses, Ports, Sockets, Name Resolution, Firewalls, Protocol Tunneling, Proxy Servers, Internet Standards, governing the web HTTP, MIME, Inside URLs, Web applications, Overview of clients/servers web communication, comparison of web servers, Common Gateway Interface CGI.

Web Page Designing: Introduction to markup languages; HTML: list, table, images, frames, forms, pages style sheets CSS; XML: DTD, XML Namespaces, XML schemes, Presenting XML with CSS and XSLT, XML-DOM, What is XHTML?

SECTION B

Client Side Scripting: Java script: Introduction, documents, forms, statements, functions, objects; Event and event handling; Browsers and the DOM, JQuery: Syntax, Selectors, Events and AJAX methods.

Server Side Programming: PHP: Introduction, requirements, PHP syntax, data type, variables, strings, operators, if-else, control structure, switch, array, function, file handling, form, sending email, file upload, session/state management, error and exception, PHP Database for dynamic Web pages.

Introduction to Servlets: Servlet Basic Servlet Structure, Servlet Lifecycle, Servlet APIs. Writing thread safe Servlets. Setting Cookies and Session Management with Servlet API.

Reference Books :

1. Jeffrey C Jackson, "Web Technology – A computer Science perspective", Person Education, 2007.
2. Chris Bates, "Web Programming – Building Internet Applications", Wiley India, 2006.
3. Xavier, C, "Web Technology and Design", New Age International
4. Ivan Bayross, "HTML, DHTML, Java Script, Perl & CGI", BPB Publication.
5. Ramesh Bangia, "Internet and Web Design", New Age International
6. Bhave, "Programming with Java", Pearson Education
7. Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education

8. Deitel, "Java for programmers", Pearson Education
9. Dustin R. Callaway, "Inside Servlets" Pearson Education.

MS(A)-212 : Java Programming

Maximum Marks: 80

Maximum Time: 3 Hrs.

Minimum Pass Marks: 35%

A) INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to Java, Why java is important to the Internet, Steps for compilation and execution of java program, Object Oriented Programming, Data types, Variables, Arrays, the Simple types, Floating Point Types, Operators, Arithmetic Operators. The Bit wise operators, Relational Operator's, Boolean, Logical Operators, Control Statements.

Introducing Classes : Class fundamentals, declaring objects, Assigning object Reference, Variables, Introducing Methods, Constructors, this keyword, Garbage collection, Overloading Using Objects and parameters, Argument Passing, Returning Objects, Recursion, Access Control, Static, Nested & Inner Classes. Exploring String class using command line Arguments. Inheritance.

SECTION B

Interface: Defining, Interface vs Abstract Classes.

Packages : Defining a package, CLASSPATH, Access protection, Importing Packages, Defining an interface, Implementing Interface. Exception handling fundamentals, Exception types, using try & catch, throw, throws, Java's Built in Exceptions, Creating your own Exception subclasses.

File Handling: reading and writing files. Java and Database: JDBC Basics, Working with database. Threading, Multithreading, Applets, Event handling, Introduction of AWT.

Reference :

1. Patrick Naughton and Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill, 1999.
2. Lemay, L. : Teach yourself Java in 21 days, Tech.
3. Griffith : 1001 Java Programming Tips.
4. Sulalman : Java Programmers Library.

MS(A)-213 : Software Engineering**Maximum Marks: 80****Maximum Time: 3 Hrs.****Minimum Pass Marks: 35%****A) INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Software Engineering : History, Definition, Goal; The role of the Software Engineer, The Software Life Cycle, The relationship of Software Engineering to other areas of Computer Science, Classification of Software Qualities, Representative Qualities, Software process models: Waterfall model, prototyping, spiral; Tools and techniques for process modeling, Management of software engineering management functions, project planning and organization.

Requirement Analysis: The requirement process, types of requirements, Characteristics and components of SRS, Data flow Diagrams, Data Dictionary, UML diagrams for specifying behaviors ,metrics, verification of SRS.

Design and Software architecture: The Software design activity and its objectives, Abstraction, Modularity, Coupling-Cohesion criteria, Object-Oriented Design: generalization and specialization, associations and aggregations.

SECTION B

Coding: Programming standards and procedures, programming guidelines, documentation, and Code verification techniques.

Verification and validation: Approaches to verification, testing goals, principles, Equivalence class partitioning, Boundary value analysis, mutation testing, graph based testing, cyclomatic complexity, test planning ,automated testing tools, features of Object-Oriented testing.

Software maintenance: The nature of maintenance, maintenance problems, maintenance techniques and tools.

Software re-engineering, reverse engineering, forward engineering: forward Engineering for Object-oriented and client/server architecture, Building blocks for CASE, CASE tools and applications.

References:

1. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, “ Fundamentals of Software Engineering”, 2nd edition Pearson Education. 2003.
2. Shari Lawrence Pfleeger, “ Software Engineering : Theory and Practice”, 2nd edition, Pearson Education, 2003.
3. P.Jalota, “An Integrated Approach to SoftwareEngineering”, Narosa Publications.
4. Roger.S.Pressman,” SoftwareEngineering-A practitioner’s Approach”, 3rd edition,McGraw-Hill.

MS(A)-214 : Computer Networks**Maximum Marks: 80****Maximum Time: 3 Hrs.****Minimum Pass Marks: 35%****A) INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Computer networks: uses of computer networks, Goals and applications of networks, Topologies, Categories of Network, Concept of Protocol Services, Reference models: OSI model, TCP/IP model, Comparison of TCP/IP and OSI models, Introduction to Novell Netware, and ARPANET.

Data Link Layer: DLL design issues, elementary data link protocols, sliding window protocols

Medium Access Sub layer: Static and dynamic channel allocation, Multiple access protocols - ALOHA, CSMA, CSMA/CD, Collision Free protocol, BRAP, MLMA, Binary countdown, Limited contention protocol, Urn Protocol, Adaptive tree walk protocol

Introduction to IEEE standards for LAN: IEEE 802.3, IEEE 802.4, IEEE 802.5, IEEE 802.11

SECTION B

Network Layer: Brief discussion on need for network layer, routing algorithm, congestion and its control methods, internetworking

Transport Layer: Transport service primitives, quality of service, Berkeley sockets, elements of transport protocols, Transmission Control Protocol (TCP).

Internet protocols: Principles of Internetworking, connectionless internetworking, Internet protocols, **Network Security:** Security requirements and attacks, encryption Public key encryption and digital Signatures. distributed applications: SNMP, SMTP, HTTP.

References:

1. A.S. Tannenbaum, "Computer Networks", 3rd Edition, Prentice Hall, 1999.
2. Data Communications & Networking by Forouzan, Tata McGraw Hills.
3. D.E. Comer, "Computer Networks and Internet", 2nd Edition, Addison Wesley Publication, 2000.
4. D.E. Comer and D.L. Stevens, "Inter-networking with TCP-IP: Design, Implementation and Internals", Vol. II, Prentice Hall, 1990.

5. D. Bertsekas and R.Gallagar, "Data Networks", 2nd Edition, Prentice-Hall, 1992.
6. Stevens W.R., " UNIX Network Programming," Prentice Hall, 1990.

MS(A)-215 : Programming Lab-IV

Maximum Marks: 100*

Max. Time: 3 Hrs.

Minimum Pass Marks: 35%

This laboratory course will mainly comprise of exercise based on subject MS(A)-211 named Web Technology.

Maximum Marks for University Examination : 60

MS(A)-216 : Programming Lab-V

Maximum Marks: 100*

Max. Time: 3 Hrs.

Minimum Pass Marks: 35%

This laboratory course will mainly comprise of exercise based on subject MS(A)-212 named Java Programming.

Maximum Marks for University Examination : 60

MS(A)-221 : Computer Graphics**Maximum Marks: 80****Maximum Time: 3 Hrs.****Minimum Pass Marks: 35%****A) INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Graphics Hardware: The Functional characteristics of the systems are emphasized.

Video Display Devices: Refresh cathode -ray tube, raster scan displays, random scan displays, colour CRT-monitors, direct view storage tube, flat-panel displays, 3-D viewing devices, virtual reality, raster scan systems, random scan systems, graphics monitors and workstations.

Scan conversion algorithms: Line using DDA and Bresenham algorithms, Circle using polar, Bresenham and Mid point algorithms, Ellipse using polar and Mid point algorithms
2-dimensional Graphics: Cartesian and Homogeneous co-ordinate system, Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Composite transformations, Two dimensional viewing transformation and clipping (line, polygon and text).

SECTION B

3-dimensional Graphics: Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Composite transformations. Mathematics of Projections (parallel & perspective). 3-D clipping.

Hidden line and surface elimination algorithms, z-buffer, scan-line, sub-division, Painter's algorithm.

Illumination Models: Diffuse reflection, Specular reflection, refracted light, texture surface patterns, Halftoning, Dithering.

Surface Rendering Methods: Constant Intensity method, Gouraud Shading, Phong Shading.

References:

1. D. Hearn and M.P. Baker, "Computer Graphics", PHI New Delhi; Second Edition, 1995.
2. J.D. Foley, A.V. Dam, S.K. Feiner, J.F. Hughes, R.L Phillips, "Introduction to Computer Graphics", Addison-Wesley Publishing company, N.Y.; Second Edition, 1994.
3. R.A. Plastock and G. Kalley, "Computer Graphics", McGraw Hill, 1986.

MS(A)-222 : LINUX Administration**Maximum Marks: 80****Maximum Time: 3 Hrs.****Minimum Pass Marks: 35%****A) INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction: Overview of Linux, Linux's History, Advantages of Linux, Minimum System Requirements; **Installing Linux:** Choosing Text or Graphics Installation, Setting up your Hard Drive, Understanding the Swap Space, Creating the Linux File-system partition, Setting up the mouse, root password and Ethernet, Configuration X, Selecting packages to Install, Creating the Boot Disk. **Using LILO boot manager:** Installing LILO, LILO make-file, Updating LILO, Removing or Disabling LILO, Troubleshooting LILO. The Boot Process, Startup Scripts, Shutdown, Halt and reboot, Creating a New Login, Virtual Terminals, Running as root.

Basic Linux Commands : How Linux Commands Work, Command Options & Parameters, Input and Output Redirection, Mian pages, Wildcards : * and ?, Environment Variables, The process status Commands : ps, termination command : kill, the su command, the grep command.

Linux File System : Common types of files, filenames, Inodes, The root directory, How directories are named, 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 Directories, Removing files and directories, Important directories in the Linux file System : / , /home, /bin, /usr, /usr/bin, /var/spool, /dev, /sbin, /etc.

File and Directory 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;

SECTION B

Shell Scripting: Creating and Executing Shell Programs, Using variables : Assigning a value to a variable, Accessing the value of a variable, Positional Parameters and other Built-In Shell Variables; Special Characters, Conditional Statements : if Statement , case Statement; Iteration Statements : for Statement, while Statement, until Statement, shift Command, select Statement, repeat Statement, Functions.

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.

Configuring the X Window: Xfree86 Software Distribution, Choosing an X Server, Installing Xfree86 Manually, Installing Xfree86 using a Script, Path Environment Variable; Configuring Xfree86; The xconfig and XF86Config Files in Detail: Pathnames, Keyboard Setting, Mouse Definition, Monitor Model, Video Cards, The Xfree86 Server, Testing Xfree86 Configurations, The .xinitrc File.

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, CD-ROM, Creating a New file System, Un-mounting file Systems, Backup and restore: Compressing files with gzip, Using tar and cpio; Setting up your System : Setting the System Name, Using a Maintenance Disk, Forgetting the root Password, Setting the Login Message.

Networking & Network Services: What is TCP/IP? IP Address, Ports, Sockets, Subnets, Routing, Hardware Requirements, Configuring the Network, Configuration Files, Testing and Troubleshooting, The netstart Command, ping, traceroute, Mail, News, NFS, www, FTP, Telnet, DNS.

Network Security: Firewalls.

REFERENCES:

1. Tim Parker : Linux Unleashed Third Edition, Techmedia, 1999.
2. Tackett, J : Special Edition using LINUX, PHI.
3. Norton, P. : Complete guide to LINUX, Techmedia.
4. Komarinski, M : LINUX System Administration Handbook, AW.
5. SUMITABHA DAS : UNIX Concepts & Application 2nd Edition, Tata McGraw-Hill

MCA(A)-223: Modern Information Systems**Maximum Marks: 80****Maximum Time: 3 Hrs.****Minimum Pass Marks: 35%****A) INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to Systems and Basic Systems Concepts, Types of Systems, Information Systems: Definition and Characteristics, Types of Information, Role of Information in Decision Making, Types of an Information system: Operations Support Systems and Management Support Systems, Comparison of EDP/MIS/DSS.

An overview of Management Information System: Definition and Characteristics, Components of MIS, Frame Work for Understanding MIS: Robert Anthony's Hierarchy of Management Activity, Information requirements and Levels of Management, Simon's Model of decision- Making.

SECTION B

Functional Information Systems: A Study of Marketing, Personnel, Financial and Production information systems, Input transaction documents, applications and reports of Marketing, Personnel, Financial and Production information systems. Models for functional information systems.

Concept of Knowledge: Definition and characteristics of knowledge, Difference between data, information and knowledge, Knowledge versus experience. Types of knowledge: Explicit and Tacit knowledge. Nonaka and Takeuchi theory of knowledge creation: Socialization, Externalization, Combination and Internalization (SECI) Model. Introduction to knowledge management and knowledge management systems. The process of knowledge management: Creation/ capture, storage and retrieval, transfer and application.

Text Books :

1. D.P. Goyal, "Management Information Systems: Managerial perspectives", Macmillan India Ltd.

Reference Books :

1. J. Kanter, Management information Systems, Prentice Hall of India.
2. Gordon B. Davis & M.H. Olson, Management Information Systems: Conceptual Foundation, structure & Development, McGraw Hills Publishing.
3. Robert G. Murdick & Joel E. Ross & James R. Claggett, Information Systems for Modern Management, Prentice Hall of India.
4. W. S. Jawadekar, Management Information Systems, Tata McGraw Hill Publishing.
5. Bryan Bergeron, Essentials of Knowledge Management, John Wiley and Sons.
6. Infosys Campus Connect Foundation Program Volume 1 – 3, Education & Research Department, Infosys Technologies Ltd, Bangalore.

MS(A)-224 : Artificial Intelligence**Maximum Marks: 80****Maximum Time: 3 Hrs.****Minimum Pass Marks: 35%****A) INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 16 marks for each question. Section C will consist of 7-16 short answer type questions covering the entire syllabus uniformly and will carry a total of 16 marks.

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory question of Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to AI : Definition, Nilsson's Onion Model explaining basic Elements of AI and AI application Areas.

Introduction to Propositional Logic: Syntax, Semantics, Inference methods in Propositional Logic.

Introduction to Predicate Logic: Syntax, Semantics of Predicate Logic, Clausal form, Resolution, Unification, Inference Mechanisms.

Knowledge Based Systems : Meaning of Knowledge, Types of Knowledge, Components of Knowledge Base System.

Knowledge Representation : Approaches to Knowledge representation, Issues in Knowledge representation, Knowledge representation using rules. Semantic Nets, Frames, Conceptual Dependencies, Scripts, CYC. **Knowledge Acquisition :** Definition, General Learning Model, Types of Learning, Factors affecting Learning.

Knowledge organization & Manipulation: Introduction, Issues in organization and manipulation.

SECTION B

Dealing with uncertainty: Symbolic reasoning under uncertainty-Introduction and logics for Non-monotonic reasoning, Implementation issues.

Expert systems : Basic Components & architecture of Expert systems, representing and using domain knowledge, ES-Shells.

Applications of AI : Game Playing-The minmax Search Procedure, Adding Alpha-beta Cutoff's Planning-Overview, Components of Planning System, Natural Language processing : Overview, Syntactic processing, Semantic analysis, Morphological, Discourse and Pragmatic processing.

References:-

1. E. Rich and K. Knight, "Artificial Intelligence", Tata McGraw Hill.

2. E. Charnaik and D. McDermott, "Introduction to Artificial Intelligence", Addison-Wesley Publishing Company.
3. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI.
4. W.F. Clovisin and C.S. Melifish, "Programming in PROLOG", Narosa Publishing Co.
5. Sanjiva Nath, "Turbo PROLOG", Galgotia Publications Pvt. Ltd.

MS(A)-225 : Programming Lab-VI**Maximum Marks: 100*****Max. Time: 3 Hrs.****Minimum Pass Marks: 35%**

This laboratory course will mainly comprise of exercise based on subject MS(A)-221 named Computer Graphics.

Maximum Marks for University Examination: 60

MS(A)-226 : Programming Lab-VII**Maximum Marks: 100*****Max. Time: 3 Hrs.****Minimum Pass Marks: 35%**

This laboratory course will mainly comprise of exercise based on subject MS(A)-222 named LINUX Administration.

Maximum Marks for University Examination: 60