

FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

M.Sc. (Internet Studies)

(Semester: I – IV)

SESSION: 2015-16



GURU NANAK DEV UNIVERSITY AMRITSAR

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Scheme of Course

SEMESTER – I:

Paper I	Web Programming	Marks : 100
Paper II	Sociology of Internet	Marks : 100
Paper III	Search Engine	Marks : 100
Paper IV	Cyber Crimes	Marks : 100
Paper V	Practical Based on Web Programming	Marks : 100

SEMESTER – II:

Paper I	Server side Web Development using ASP.NET	Marks : 100
Paper II	Business on the Internet	Marks : 100
Paper III	Web based Multimedia	Marks : 100
Paper IV	Online Communities	Marks : 100
Paper V	Practical Based on Server side Web Development	Marks : 100

SEMESTER – III:

Paper I	Content Management System	Marks : 100
Paper II	Digital Rights Management	Marks : 100
Paper III	Cyber Laws	Marks : 100
Paper IV	Practical based on Content Management System	Marks : 100
Paper V	Project (Part – I)	Marks : 200

SEMESTER – IV:

Paper I	Internet Security	Marks : 100
Paper II	Web Services	Marks : 100
Paper III	Open Sources Software	Marks : 100
Paper IV	Project (Part – II)	Marks : 300

Paper I - Web Programming**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

The Web: Historical Perspective of HTTP, Uniform Resource Locator, Request-Response paradigm, Statelessness, Request Methods with Status Codes, Structure of HTTP Message: Content Types, caching control, security, session support; Virtual Hosting, Caching Support and Persistent Connections.

Client Side Script: Scripting Language variables, functions, conditions, Objects; DOM, Data Validation, Web browser Configuration, Comparison of Client Side Scripting Languages.

Browser Languages:

XHTML: Forms, Frames, Tables etc.

DHTML: Cascading Style Sheets, Object Model, Event Model, Filters and Transitions, Data Controls, Handling of Multimedia Data ;

XML: Introduction, Syntax, Document structure, Document type Definitions, namespaces, XML schemas, Displaying raw XML documents, Displaying XML documents with CSS, XSLT stylesheets, XML Processors, Introduction XSL, XML transformed, XSL elements transforming with XSLT, web feeds (RSS).

Overview of Server Side Script:

Static vs. Dynamic web pages, Need of Server Side Scripting, Server Side scripting, Multitier Web Architecture

Books Recommended:

1. Leon Shklar and Rich Rosen, Web Application Architecture: Principles, Protocols and Practices, Wiley, 2009.
2. Chris Bates, Web Programming: Building Internet Applications, John Wiley and Sons Ltd., 2006.
3. Patrick Carey, HTML, XHTML and XML , Course Technology CENGAGE Learning, 2010.
4. Elliotte Rusty Harold and W. Scott Means, XML in a Nutshell, O'REILLY, 2001-2004.
5. Paul Wilton, Beginning Javascript, Wiley – India, 2004.

Paper II - Sociology of Internet**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Social Relationships: Social relationship with or without Internet. Issues of socializing on Internet.

Cultural Impacts: Reshaping culture by Internet, Effect on living habits of people as an individual and in groups, Social implications for families, Schooling, Work, Leisure activities.

Language, Ethnicity and Nationalism: Internet as a medium for the expression and distribution of the cultures of local groups and individuals.

Education: Change in teaching and learning methodologies through Internet, Online education, The effectiveness of technology as a tool for learning, The financial implications of the introduction of IT related technologies in class rooms and learning, The changing role of students and teachers in computer mediated learning.

Business: Effect of Internet on Business and Corporations, Business on Internet and vice-versa, Issues of business through Internet.

Telework: Main Characteristics of Telework, Advantages and Disadvantages, Issues related with Telework, Effect on the organization of work, Importance of the trade unions, political protests etc.

E-Governance: Use of Internet by the world governments in the conduct of their functions e.g. services and information etc., Changes in the nature of government and the role of the electorate and citizens, Government's regulations on Internet and its difficulties.

Enhancing Literacy Skills: Human communications by reading, writing and typing on e-mail, list serves, chats, Usenet etc., its effect on the literacy; Reading and writing skills; Usage of books, Greater use of libraries through online access and digitization of holding archives and database, Impact on the existence of libraries and their budgets.

Books Recommended:

1. Giannis Stamatellos; Computer Ethics: A Global Perspective; Jones & Bartlett Learning, 2006.
2. D.R. Wilson; Researching Sociology on the Internet; Thomson/Wadsworth, 2004.
3. John Armitage; Living with Cyberspace : Technology and Society in the 21st Century, Continuum International, 2002
4. Allison Cavanagr; Sociology in the Age of the Internet; McGraw Hill International, 2007.
5. Manuel Castells; The Rise of the Network Society: Economy, Society and Culture; Wiley Blackwell, 2010
6. Jan Van Dijk; The Network society; SAGE Publications limited, 2006.

Paper III - Search Engine**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Search Engines: Need of Search Engines, Architecture of Search Engine, Working of Search Engine, Types of Search Engine

Directories: Need of Directories, Implementation, Difference between Search Engines and Directories.

Searching Using Keywords: Keywords, Choosing the right keywords, Keywords density, Optimizing keyword density for search engines, Tools and services that help to find the best keywords.

Basic Search Operators: Searching in Plain English, Searching for multiple words and phrases, AND Searches, OR Searches, NOT Searches, NEAR Searches, Parentheses and Nested Searches using Wildcards, Dealing with Stopwords , Stemming

Search Engine Algorithms: Google PageRank Algorithm, Ranking websites based upon a search term, Important factors affecting search engine rankings.

Optimizing Websites for Search Engines: Relevance of the Contents, Main Keywords, Initial Promotion of Websites, Link Building, Back Links, Sitemap, Performance Monitoring of website in the search engines, Search Engine Optimization (SEO), Importance of keywords in SEO.

Case Study of Search Engines: Google, Altavista, Hotbot, Yahoo, Lycos, Bing, Future of Search Engines.

Books Recommended:

1. Aefred Glassbrener Enily, Search Engine for the World Wide Web, Peachpit Press, 2001.
2. Mark levene, An Introduction to Search Engines and Web Navigation, John Wiley and Sons, 2010.
3. Shari Thurew, Search Engine visibility Part-II, New Riders, 2003.
4. FricFng Stephan Spencer, The Art of SEO, Oreilly media Inc., 2009.

Paper IV - Cyber Crimes**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Evolution of Cyber Crimes: Nature of Cyber Crime, History of Cyber Attacks, Vulnerabilities of New Technologies, Cyber Crime in different areas.

Classification of Cyber Crimes: E-Mail, Spoofing, Spamming, Cyberdefamation, Internet Time Theft, Salami Attack, Data Diddling, Web Jacking, Newsgroup Spam, Industrial Spying, Hacking, Online Frauds, Pornographic Offenses, Software Piracy, Computer Sabotage, E-Mail Bombing, Computer Network Intrusions, Password sniffing, Credit Card Frauds, Identity Theft, Cyberstalking, Cyber Terrorism.

Tools & Methods used in Cyber Crime: Phishing, Password Checking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, DoS and DDoS, SQL Injection, Attacks on Wireless Networks.

Critical Infrastructure Protection and Cyber Crime: What is Critical Infrastructure, Scientific and Technological Nature of Critical Infrastructure Vulnerabilities (The Electronic Power Grid, Other Critical Infrastructure), Internet Infrastructure Attacks (Internet Router Attacks, Domain Name Services (DNS) Attacks).

Cyber Crimes: Legal Perspectives: Indian Perspective, Latest Cybercrimes in India, Government's Initiative to handle cybercrimes, Information Technology Act 2000.

International Dimensions of Cyber Crime: A global perspective on Cyber Crime, International bodies to control Cyber Crime (Organization for Economic Cooperation and Development (OECD), The United Nations, G-8), Importance of Building International Consensus on Cyber Crimes.

Books Recommended:

1. Sumit Ghosh, Elliot Turrins- Cyber Crimes – A Multidisciplinary Analysis; Springer, 2006.
2. Nina Godbole, Sunit Belapure- Cybre Security: Wiley- India; 2012.
3. Atul Jain; Cyber Crime- Issues, Threats and Management; Gyan Publishing.
4. David Wall; Cyber Crime- The Transformation of Crime in the Information Age; Polity Press, 2007.
5. Roderic G. Broad Hurst, Peter.N. Grabesky; Cyber Crime- Challenge in Asia.

Paper V - Practical Based on Web Programming

Marks: 100

Paper I - Server side Web development using ASP.NET**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Scripts: Embedding Script, Configuring Server/Browser for a Script.

Processing Forms: Pass form inputs to a Script, Self-Submission, Query String, Data Validation, Develop a login page.

Managing State: Various Means to manage State, Managing Sessions and using Session Variables, Creating a Session and Registering Session Variables, Destroying a Session, Storing Data in Cookies, Setting Cookies, Retrieving Cookie Data, Deleting Cookies, Configuration Issues, Develop a Chat Server.

Working With Email: Understanding E-mail -TCP/IP server, Mail Transfer Agent, Mail spool, Mail User Agent, Mail-retrieval program, Mailing list manager; Sending Emails - Attachments, Message Priorities, HTML Formatting and Images, Retrieving Email, Email Auto Responding, Creating a Simple List Server.

Database Operations: Making a Connection, Returning Information from a Database, Changing Information in a database, Executing Stored Procedures, Developing a Discussion Form, A Job Site, Web log, Shopping Cart.

Working with the File System : Elementry Concepts of File system, File Upload and Download systems, Security enforcement and various access Permissions, Directory Structure Listing, Develop a simple Search Engine, Generating Personalized PDF Documents.

Working with XML: Data Binding and Displaying XML Data, Transforming XML, Conversion between XML and Relational Data, Develop a Personal Address Book.

Securing Web Site: Encryption, Authentication and Data Integrity with SSL, Password-Protecting Web Site.

Books Recommended:

1. Walther, Active Server Pages 2.0 Unleashed, BPB Publications, 1999.
2. Elizabeth Naramore, Jason Gerner, Beginning PHP5, Apache, MySQL Web Development, Wiley, 2005.
3. Stephen Walther, ASP.NET 3.5 UNLEASHED, Pearson Education, 2006.
4. Luke Welling, Laura Thomson, *PHP and My SQL Web development*, Addison-Wesley, 2008.

Paper II - Business on the Internet**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Introduction: Meaning and Concept, Advantages and Disadvantages, Electronic Commerce vs. Traditional Commerce, E-Commerce and Media Convergence; Autonomy of E-Commerce Applications, Types of E-Commerce; Architectural Framework for Electronic Commerce.

Business Models of E-Commerce and Infrastructure: E-Commerce Models, Supply Chain Management, Product and Service Digitization, Remote Servicing, Procurement; Online Marketing; Advertising; E-Commerce Resources and Infrastructure; Resources and Planning for Infrastructure.

Web-Site Design: Role of Web site in B2C E-Commerce; Web-site strategies and Web-site Design Principles; Push and Pull technologies; Alternative methods of Customer Communication.

Electronic Payment System: Special features required in payment systems for E-Commerce; Types of E-payment systems; E-cash and currency servers, E-cheques, Credit Cards, Smart Cards, Electronic Purses and Debit Cards; Business Issues and Economic Implications; Operational Credit and Legal Risks of E-payment Systems; Risk Management options in E-payment Systems; Components of an effective Electronic Payment System.

Case Studies: E-Commerce in various business areas like Banks, Reservations, E-Governance, Supply- Chain Management, Manufacturing, Retailing and On- Line Publishing.

Regulatory and Legal Framework of E-Commerce: Cyber Laws –Aims and Salient Provisions; Cyber Laws in India and their limitations; Taxations Issues in E-Commerce.

Books Recommended:

1. Agarwala, K.N. and Deeksha Ararwala: Business on the Net: What's and How's of E-Commerce; Macmillan, New Delhi.
2. Agarwala, K.N. and Deeksha Ararwala: Business on the Net: Bridge to the Online Storefront: Macmillan, New Delhi.
3. Ravi Kalakota, Andrew B. Whinston: Frontiers of Electronic Commerce: Addison Wesley.
4. Efrain Turbson, Jae Lee, David King, Chung: Electronic Commerce- A Managerial Perspective, Prentice- Hall International.
5. Greestein, Feinnman: Electronic Commerce, Tata McGraw- Hill.
6. Jeffrey F. Rayport, Bernard J. Jaworski: E- commerce, Tata McGraw Hill.

Paper III – Web Based Multimedia**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Multimedia and the Web: Web based Multimedia basics, Objects of Multimedia (Text, Images, Animation, Audio, Video), Web based Multimedia Applications

Accessing Multimedia using Web Browsers: File Formats and various supportive file extensions, Role of Web Browsers to run web based multimedia programs, Common plug-in's for web browsers

Multimedia Streaming: Multimedia Streaming Concepts, Components, Common Streaming Media Codecs

Audio & Video Asset Production : Basic Principles of managing audio and video, Dealing with sounds (Mono, Stereo and Surround) and various related techniques for Digitization, Digital basics for audio asset production – Aliasing, MIDI and Editing, Digitizing video for multimedia.

Designing Multimedia based Website: Basic Design Principles, Evaluation of Requirements and Intended Objectives, Design Methodologies, Page layouts and Storyboards, Navigational Design, Access Considerations.

SMIL 2.0 : Basics, Design Goals, Modules and Profiles, Structure and Layout, Elements & Attributes, Referencing Media Objects, Linking and Content Control Elements, Timing Models and Transition Effects, Advanced SMIL Features.

Books Recommended:

1. Elaine England and Andy Finney, Managing Multimedia: Project Management for Web and Convergent Media, Third Edition Addison Wesley, 2002.
2. Ramesh Bangia and Meenakshi Arora, Comprehensive Multimedia and Web Technology XII, Laxmi Publications, 2006.
3. Timothy Paul Garrand, Writing for Multimedia and the Web: A Practical Guide to Content Development Edition, Focal Press, 2006.
4. Dick C.A. Bulterman, Lloyd Rutledge, SMIL 2.0: Interactive Multimedia for Web and Mobile Devices, Springer Verlag Berlin Heidelberg New-York, 2004.

Paper IV - Online Communities**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Introduction: Origin and need of online communities, Features and commercial benefits of online communities, online community vs Lists, Discussion Groups or Forums, Advantages and Disadvantages of online communities.

Community Framework: Framework for online communities, User profiles, usability Security; open vs closed communities, Themed communities like health communities, e-commerce communities etc.

Developing an online community: Community strategy, Planning online community, Infrastructural Layout, Hardware / Software resources, User interface design, Safety measures for bandwidth theft, Freedom of speech, Multiple accounts, User accounts management.

Promoting and Monetizing Community: Collaborations with search Engines, Directories, Link Exchange, Contest and give aways, Post Exchange, Paid Memberships, Advertising, e-commerce and donations.

Overview of Blogs and Social networking.

Books Recommended:

1. Patria O. Keefe – Managing Online Forums: Everything you need to know to create and run Successful Community Discussion Boards, AMACOM, A Division of American Management Association, 2008.
2. Nancy Strauss & Anna Buss, Online communities Hand book – Building your Business & Brand on the Web, New Riders Publications.(A Division of Pearson Education) 2009.
3. Rober.T. Douglass, Building online Communities with Drupal, PHPBB and Word Press, A Press, 2006.
4. Timo Beck – Web 2.0: User generated content in online communities – A theoretical and empirical inversitigation of its determinants, Hamburg, Diplomica Verlag GmbH, 2007.
5. Felicia Wu Song, Virtual communities by Bowling Alone, Online Together, Library of Congress Cataloging- in- Publication Data.

Paper V: Practical based on Server Side Web Development using ASP

Marks: 100

Paper I - Content Management System**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

What is Content Management: What is Content-Defining Data, Information and Content, Format and Structure, Understanding Content Management, Introducing the Major Parts of a CMS, Need for an Effective CMS, Qualities of Good CMS, Component Management versus Composition Management, Roots of Content Management, Branches of Content Management.

Content Management Projects: Staffing a CMS, Working within the Organization and Getting Ready for a CMS, Securing a Project Mandate, Requirements Gathering, Logical Design, Hardware and Software Selection, Implementing the System, Rolling Out the System.

Designing a CMS: Wheel of Content Management, Working with Metadata, Cataloging Audiences, Designing Publications and Content Types, Accounting for Authors, Accounting for Acquisition Sources, Designing : Content Access Structures, Templates, Personalization, Workflow and Staffing Models.

Building a CMS: Content Markup Languages, XML and Content Management, Processing Content, Building Collection Systems, Building Management Systems, Building Publishing Systems.

Buying a CMS: Reasons, Purchase Process, Questions to be asked.

Study of various CMS Tools : Joomla, Drupal.

Books Recommended:

1. James Ellis, Dave Addey, Phil Suh, David Theimecke, Content Management Systems (Tools of the Trade) Apress, 2003.
2. Bob Boiko, Content Management Bible, Wiley, 2004.
3. Gaurav Kathuria, Web Content Management with Documentum : Setup, Design, Develop, and Deploy Documentum Applications, Packt Publishing, 2006.

Paper II - Digital Rights Management**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Introduction: Intellectual Property and Copyright, Meaning of Digital Rights Management and its various Aspects, Requirement of DRM System, Benefits of DRM Environment for DRM systems, Components of DRM System, Underlined Architecture, DRM Perspectives – Design and Implementation.

DRM Technologies: Technologies to Protect Content like Film, Music,(Audio CD's & Internet Music) Computer Games, E-books and Documents; Direct Protection of the Content, Digital Watermark, Digital Fingerprint, Encryption, Identifications, Biometrics in DRM.

Economic Aspects: Basic Economic Theory of Copying, Impact of DRM on Internet based Innovations, Evaluating Consumer Acceptance in DRM – Trends and Recommendations.

Others Issues related to DRM: DRM Standards, Laws regarding DRM, Digital Millennium Copyright Act, International Issues and Various Controversies related to DRM Study and its Shortcomings.

Books Recommended:

1. Eberhard Becker, Williams Buhse, Dirk Gunnewig Neils Rump, Digital Rights Management – Technological Economic, Legal and Political Aspects, Springer, 2003.
2. William Rosenblatt, Bill Rosenblatt, William Trippe, Stephen Mooney, Digital Rights Management Business & Technology, M&T Books, 2002.
3. Joan Van Tassel – Digital Rights Management Protecting & Monetizing Contents, National Association of Broadcasters (NAB) and Focal Press.
4. Wenjun Zeng, Hong Heather Yu, Ching Yung Lin, Multimedia Security Technologies for Digital Rights Management, Academic Press (Imprint of Elsevier) 2006.

Paper III - Cyber Laws**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

The Concept of Cyber Space , Analytical Model of Cyber Law in Security & Society; Cyber Law Hypothesis, Need, scope and Advantages of Cyber Laws, Cyber Laws in India, Cyber Law Act in different Countries.

Contracts in the InfoTech World: Click-wrap and Shrink-Wrap Contracts, Status under the Indian Contract Act 1872, Contract Formation under the Indian Contract Act 1872, Contract Formation on the Internet.

Jurisdiction in the Cyber World: Civil Law of Jurisdiction in India, Jurisdiction and Information Technology Act, Legal Principles on Jurisdiction in U.S.A, Jurisdiction Disputes w.r.t. the Internet in U.S.A.

Copyright Protection in the Cyber World: Meaning of Copyright, Copyright Ownership, License of Copyright, Copyright Protection of Content on the Internet, Downloading for Viewing Content on the Internet, Hyper Linking and Framing, Computer Software Piracy.

Legal Framework of E-Commerce: E-Commerce Taxation and its Problems, United Nations Model Tax Treaty, Taxation Policies in India, Digital Signatures, Digital Signature Certificate, Certifying Authorities and Liability in the Event of Digital Signature Compromise.

Amendments in the Indian Evidence Act by the IT Act: Electronic Records as Evidence, Proof and Management of Electronic Records, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.

Information Technology Act 2000 : An Overview: Other Different Cyber Crimes and the IT Act, 2000, IT Act Offences (Hacking, Teenage Web Vandals, Cyber Fraud and Cyber Cheating, Virus on the Internet, Defamation, Harassment & E-mail Abuse, Cyber Pornography) Monetary Penalties, Adjudicatory and Appeals Under IT Act 2000, Network Service Providers Jurisdiction and Cyber Crimes, E- Governance & IT Act 2000.

An Overview of Cyber Laws in United States of America (USA)- Introduction to US Legal System, Digital Evidence & US Law, Searching and Seizing, Computers, Criminal Investigation involving Digital Evidence.

Books Recommended:

1. Vivek Sood, Cyber Law Simplified, Tata Macgraw Hill, 2001.
2. Pavan Duggal, Cyber Law: The Indian Perspective, Saakshar Law Publications, Delhi
3. Anupa Kumar Patri, Cyber Law- A View to Social Security, YFI & Anupa P.Kumar, 2009.
4. George.B. Delta, Jeffrey H. Matsuura, Law of the Internet, ASPEN Publishers.

Paper IV -Practical based on Content Management System

Marks: 100

Paper V – Project (Part-I)

Marks: 200

Students are required to develop a Website/ Online Community/ Any Module related with Internet Technologies/ Case Studies.

Paper I - Internet Security**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Foundations of Internet Security: Facets of Internet Security, Layered Protocol Models, Internet TCP/IP Model, Security and Layered Internet Protocols, Security at the TCP layer

Classes of Attack: Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failures, Information Leakage, Exponential Attacks, Viruses and Worms, Denial-of-Service Attacks, Botnets and Active Attacks

The Hacker's Workbench and other Munitions: Introduction, Hacking Goals, Scanning a network, Breaking into the host, and Battle for the host, Covering tracks, Metastasis, Hacking tools

Safer Tools and Services: Authentication, Time based one time passwords, Challenge one time passwords, Lamport's one time password algorithm, Smart cards, Biometrics, RADIUS, SASL, Host to Host Authentication

Firewalls and Proxy Servers : Kinds of Firewalls, Packet Filters, Application-Level Filtering, Circuit-Level Gateways, Dynamic Packet Filters, Distributed Firewalls, What Firewalls Cannot Do, Filtering Services, Reasonable Services to Filter, Digging for Worms, Packet Filtering, Implementing policies (Default allow, Default Deny) on proxy.

Cryptographic Techniques: Cryptographic Hash functions, Secret Key Cryptography, Public Key Cryptographic, Digital Envelopes, Protection of Cryptographic keys, Generation of Pseudo random Bit sequence

Books Recommended:

1. William. R. Cheswick, Steven M. Bellovin, Firewalls and Internet Security; Addison-Wesley Professional Computing Series; 2003.
2. John R. Vacca; Practical Internet Security; Springer; 2007
3. Internet Security: in Easy Steps, Greg Holden.
4. Larry J. Huges; Actually useful Internet Security Techniques; Jr New Riders Publishing; 2002
5. Rolf Oppliger; Internet and Intranet Security; Artech House; 2002

Paper II - Web Services**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Evolution and Emergence of Web Services: Evolution of distributed computing, Core Distributed Computing Technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, Role of J2EE and XML in Distributed Computing, Emergence of Web Services and Service Oriented Architecture (SOA).

Introduction to Web Services: The definition of web services, Basic Operational Model of Web Services, Tools and Technologies Enabling Web Services, Benefits and Challenges of using Web Services , Web Site vs Web Services

Web Services Architecture: Web services Architecture and its characteristics, Core Building Blocks of Web Services, Standards and Technologies available for Implementing Web Services, Web Services Communication, basic steps of implementing web services, Developing Web Services enabled applications.

Core Fundamentals of SOAP: SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security

Developing Web Services using SOAP: Building SOAP Web Services, Developing SOAP Web Services using Java, limitations of SOAP.

Describing Web Services: WSDL – WSDL in the World of Web Services, Web Services life Cycle, Anatomy of WSDL Definition Document, WSDL Bindings, WSDL Tools, Limitations of WSDL

Discovering Web Services: Service discovery, Role of Service Discovery in a SOA, Service Discovery Mechanisms, UDDI – UDDI Registries, Uses of UDDI Registry, Programming with UDDI, UDDI data structures, Support for Categorization in UDDI Registries, Publishing API, Publishing Information to a UDDI Registry, Searching Information in a UDDI Registry, Deleting Information in a UDDI Registry, Limitations of UDDI.

Web Services Interoperability: Means of Ensuring Interoperability, Overview of .NET and J2EE.

Web Services Security: XML Security Frame Work, XML encryption, XML digital signature, XKMS structure, Guidelines for Signing XML Documents.

Books Recommended:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, 2008.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
4. B.V. Kumar, Web Services, Tata Mac Graw Hill, 2004.

Paper III - Open Sources Software**Time: 3 Hrs.****Marks: 100**

Note: Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.

Software and Intellectual Property Rights: Basic Principles of Copyright Law, Contracts, Patents, Licenses, Issues with copyrights and patents, Open Source Software Licensing

Open Source Software: Early History, Categories of Open Source Software, Specific Characteristics of OSS

Organization and Management of OSS: OSS development Process, Taboos and norms in OSS development, The OSS development life cycle

Development of OSS: Methodology and languages used to develop open source products, Cross Platform code

Managing System Implementation: Implementation Roles, Implementation Process, Implementation Principles

Extending open source principles beyond software development: Network enabled Collaboration, Building Internet operating system, the rise of Modern Bio Technology and open source biology.

Case studies of open sources like Mozilla, PHP, Apache, Joomla, Drupal, Fedora, WiKipedia etc.

Books Recommended:

1. Joseph Feller & Brian Fitzgerald, Understanding Open Source Software Development, Pearson Education Limited, 2002.
2. Paul Kavanagh, Open Source Software: Implementation and Management, Elsevier Digital Press, 2004.
3. Joseph Feller, Perspectives on Free and Open Source Software, MIT Press Books, 2005.
4. Chris Dibona, Danese Cooper, Mark Stone, Open Sources 2.0, The Continuing Evolution, O' Reilly, 2006.
5. Tim O' Reilly, Tom Paquin: Open Source Voices from the Open Source Revolution, O' Reilly, 2006.
6. Morino Muffatto: Open Source , A Multi Disciplinary Approach, Imperial College Press, World Scientific Publishing Co., Pvt Ltd, 2006.

Paper IV – Project (Part–II)**Marks: 300**

Students will continue the same Project as already selected in Semester III.

Note:

1. The end semester project work evaluation is to be conducted by following panel of examiners:-
 - a. Internal Examiner
 - b. External Examiner (to be appointed by GND University, Amritsar)
 - c. Head/Head's nominee (where Head means Head, DCSE, GND University, Amritsar.)
2. The Project are to be submitted as per the common ordinances for P.G. courses under semester system.