S-08th July, 2014 AC after Circulars from Circular No.84 & onwards - 22 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO. ACAD/SU/Engg./M.C.A./97/2014

It is hereby informed to all concerned that, the syllabus prepared by the Board of Studies in Computer Science & Engineering and recommended by the Faculty of Engineering and Technology, the **Academic Council at its meeting held on 08-07-2014 has accepted the "Revised Syllabus of M.C.A. Third Year" as appended herewith.**

This is effective from the Academic Year 2014-2015 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. ACAD/ SU/ MCA/
SYLLAB. / 2014/16646-75
A.C.S.A. I.No.447[03].

Date:- 13-08-2014.

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Director,
Board of College and
University Development.

Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.
2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above syllabus on University Website.**

Copy to :-

1] The Controller of Examinations,
2] The Superintendent, [Engineering Unit],
3] The Superintendent, [Eligibility Unit] ,
4] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
5] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Revised Syllabus of

MCA

THIRD YEAR

UNDER THE FACULTY OF ENGINEERING & TECHNOLOGY.

[Effective from 2014-15 & onwards]

Faculty of Engineering & Technology

Proposed Curriculum structure of Third Year M.C.A.

Part – I **w.e.f. July 2014**

Sr.No	Subject Code	Subjects	Teaching Scheme [Hours/Week]		Examination Scheme [Marks]					Duration of Theory Examination
			Lecture	Practical	Theory	CT	TW	PR	Total	
1	MCA 301	Image Processing and GIS	4	--	80	20	--	--	100	3 Hrs
2	MCA 302	Cyber Security	4	--	80	20	--	--	100	3 Hrs
3	MCA 303	Cloud Computing	4	--	80	20	--	--	100	3 Hrs
4	MCA 304	Enterprise Resource Planning	4	--	80	20	--	--	100	3 Hrs
5	MCA 331,332	Elective I	4	--	80	20	--	--	100	3 Hrs
6	MCA 321	Lab I Image Processing and RAS-GIS	--	2	--	--	25	25	50	--
7	MCA 322	Lab II Cyber Security	--	2	--	--	25	25	50	--
8	MCA 323	Lab III Research Methodology	--	2	--	--	50	--	50	--
9	MCA 324	Lab IV Project	--	4	--	--	50	50	100	--
Total of I			**20**	**10**	**400**	**100**	**150**	**100**	**750**	

Elective I:

1. MCA331 - Mobile Computing
2. MCA332 - Embedded System

Part – II

Sr.No	Subject Code	Subjects	Teaching Scheme [Hours/Week]		Examination Scheme [Marks]				
			Lecture	Practical	Theory	CT	TW	PR	Total
1	MCA 371	Lab V Seminar	--	2	--	--	50	--	50
2	MCA 372	Lab VI Dissertation	--	4	--	--	50	150	200
Total of II				6	--	--	100	150	250
Total of I and II					**400**	**100**	**250**	**250**	**1000**

CT : Class Test
TW : Term Work
PR: Practical

1

Title of the subject: Image Processing and RS-GIS
Course Code: MCA 301

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 Hrs]
Class Test: 20 Marks

Objectives:

- Introduce Fundamentals of digital image processing and algorithms that are used.
- Understand the basic principles and methods of digital image processing and remote sensing.
- Be able to formulate solutions to general image processing problems
- Introduce what a geographic information system (GIS) and some basic analytical capabilities of a modern GIS.

Unit 1 Introduction to digital Image Processing: 10 Hrs

DIP: Introduction, Applications, Fundamental steps in image processing, Image sensing and acquisition, Image sampling and quantization, Relationship between pixels, Mathematical tools for image processing.
Transformation: Introduction to transformation and intensity transformation, Functions, Spatial domains, Sine and Cosine transformation, Fourier transformation, Histogram

Unit 2 Morphological Image Processing: 10 Hrs

Morphological Operations: What is morphology? Erosion and Dilation, Opening and Closing, Hit or miss transformation,
Morphological Algorithms: Boundary Extraction, Hole Filling, Extraction of Connected components, Thinning, Thickening, Pruning, Skeleton,
Gray Scale Morphology.

Unit 3 Image Segmentation and Object Recognition: 10 Hrs

Image Segmentation: Fundamentals, Point, Line and Edge Detection, Region Based segmentation, Segmentation using watersheds.
Object Recognition: Pattern and Pattern classes, Structural Methods, Matching Shape Numbers String Matching,

Unit 4 Fundamental of RS and GIS 10 Hrs

Remote Sensing: Basic Principles of RS Electromagnetic RS, Microwave RS, Factors affecting microwave measurement, SLAR, SAR, Interpreting SAR Images, Geometrical RS and Sensors, Satellite system parameters, Sensor Parameters, Imaging Sensor Systems.
GIS: Definition, Evolution, Components, approaches, GIS Operations.
GIS Architecture, Model of GIS, Framework of GIS,GIS Categories, levels/Scales of Measurements.
Map projections, Map as a model, classification of Maps, Map Scale, Types of Map, Spatial referencing system, Map Projection

Text Book:

1. 'Digital Image Processing', Rafael C. Gonzalez, Richard E. Woods, Pearson, Third Edition

2. 'Fundamentals of Digital Image Processing', Anil K. Jain, Pearson, 2008.

3. 'Textbook of Remote Sensing and GIS', Kali Charan Sahu, Atlantic Publishers & Dist., 2007

4.'Remote Sensing and GIS', Basudeb Bhatta', Oxford University Press.

Reference Books:

1. 'Digital Image Processing', W.K.Pratt, Third Edition, John Wiley & sons, Inc. 2006

2. 'Introductory Digital Image Processing: A remote Sensing Perspective' John R. Jenson Prentice Hall, Jersey.

3. 'Introduction to Remote Sensing', James Cambell, Taylor and Francis

4. Remote Sensing and Image Interpretation. 6th ed. Lillesand, T.M., Kiefer, R.W. and Chipman.J.W. 2008. New York: John Wiley & Sons.

5. Fundamentals of Remote Sensing, George Joseph (2004), Universities Press (India) Private Limited.

6. Fundamentals of Satellite Remote Sensing, Emilio Chuvieco, Alfredo Huete (2010), CRC Press, Taylor & Francis Group

3

Title of the subject: Cyber Security
Course Code: MCA 302

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Unit 1	Introduction: Cyber security, Cyber security policy definition, Domains of cyber security policy. Cyber Security Evolution: Productivity, Internet, e-commerce, Counter measures, Challenges. Cyber Security Objectives: Cyber security metrics, Security Management goals, Counting vulnerabilities, Security frameworks, Security Policy Objective.	10 Hrs
Unit 2	Cyber Security Myths, Information Security versus Cyber security, Business Continuity and Risk Management. Steps for setting up Cyber Security in organization.	06 Hrs
Unit 3	IPSec –security at the network layer, Security at transport layer, IEEE 802.11 wireless LAN security, Cellphone security. Denial of Service (DOS), Distributed DOS (DDOS), Session Hijacking and spoofing, Pharming attack, Wireless LAN vulnerabilities. Software Vulnerabilities: Phishing, Buffer overflow, format string attacks, Cross site Scripting(XSS), SQL injection	14 Hrs
Unit 4	Virus and worm features, Internet scanning worms, Topological worms, web worms, Mobile malware, Botnet. Access Control in operating system, Firewall. Intrusion Prevention and Detection: Prevention versus detection, Types of Intrusion detection system, DDOS attack prevention/Detection, Malware detection. Web Services Security: Entities involved, Technologies for web services-XML,SOAP,WSDL and UDDI, WS-Secuirty, SAML,WS-Trust.	10 Hrs

References:

1. Bernard Menezes , Network Security and Cryptography, Cengage Learning India Pvt Ltd,2011
2. Jennifer L. Bayuk, Jason Healey, Paul Rohmeyer, Marcus H. Sachs, Jeffrey Schmidt, Joseph, WeissCyber Security Policy Guide Book, Weiley 2012
3. Dejan Kosutic, 9 Steps to Cyber Security The Manager's Information Security Strategy Manual, EPPS Services Ltd, Zagreb,2012
4. William Stallings, Cryptography and Network Security: principles and practice, Prentice Hall, 2010.

4

Title of Subject: Cloud Computing
Course Code: MCA 303

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 Hrs]
Class Test: 20 Marks

Prerequisite

- Knowledge of Computer Network.
- Knowledge of computer operating system.
- Knowledge of database architecture.

Objectives:

- To make students familiarize with virtualization.
- To make student familiarize with virtual operating system and cloud
- To make student familiarize with virtual storage.
- To familiarize students with open source tools for cloud computing.

Unit 1	**Introduction** Introduction to cloud and evolution of Cloud Computing – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture – Infrastructure as a Service (IaaS) – Resource Virtualization – Platform as a Service (PaaS) – Cloud platform & Management – Software as a Service (SaaS) – Available Service Providers, Benefits, web services. Advantages and disadvantages of cloud computing.	**14 Hrs**
Unit-2	**Virtualization** Basics of virtualization - Types of Virtualization – Need of virtualization – cost, administration, fast deployment, reduce infrastructure cost, limitations, Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Desktop virtualization – Server Virtualization	**12 Hrs**
Unit 3	**Security in cloud computing** Cloud security fundamentals, vulnerability assessment tools for cloud, privacy and security in cloud, cloud computing security challenges: virtualization security management – virtual threats, VM security recommendations, VM specific security techniques, secure execution environments and communication in cloud, security concerns – privacy concern with third party, security level of third party, security benefits.	**10 Hrs**
Unit-4	**Governance and enterprise risk management** Governance and enterprise risk management – information security governance processes, Governance and enterprise risk management in cloud computing, governance recommendations, enterprise risk management recommendations, third party management recommendations, compliance and audit – cloud customer responsibilities, compliance and audit security recommendations.	**6 Hrs**

5

Text Books:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

2. John W. Rittinghouse and James F.Ransome "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010

References:

3. Michael Miller: cloud computing: web-based applications that change the way you work and collaborate online, Que publishing, Aug 2008.

4. Haley Beard, cloud computing best practices for managing and measuring processes for on-demand computing, applications and data centers in the cloud with SLAs, Emereo Pty limited, July 2008.

5. Cloud computing a practical approach- Anthony T. Velte, Toby J. Velte Robert Elsenpeter TATA McGraw- Hill, New Delhi 2010.

6. Cloud security and privacy, Tim Mather Subra Kumaraswamy, O, Really 2009.

7. Security guidance for critical areas of focus in cloud computing V2. I prepared by the cloud security alliance, December 2009.

8. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

9. John W. Rittinghouse and James F.Ransome "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010

6

Title of Subject: Enterprise Resource Planning
Course Code: (MCA-304)

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 Hrs]
Class Test: 20 Marks

Objective:

- To understand the role of Enterprise Resource Planning in business planning activities.
- Students will learn fundamentals of enterprise resource planning (ERP) systems concepts, and the importance of integrated information systems in an organization.
- This course will enable the student to learn the conceptual basis for enterprise-wide information system by illustrating procurement, production, and sales business processes using ERP software.

Prerequisite Knowledge: Fundamentals of Business Process, Software Project Management.

Unit-I	**Fundamentals of ERP:** Needs and Evolution of ERP Systems, Benefits of ERP, Factors Affecting on ERP. **ERP and Related Technologies:** Business Process Reengineering, Supply Chain Management, Online Analytical Processing (OLTP), Customer Relationship Management (CRM),Data Warehousing, Data Mining, Management Information System (MIS) Executive Support System (ESS) Decision support system(DSS).	**10 Hrs**
Unit-II	**Implementation of ERP:** Implementation Life Cycle: - Implementation Methodologies and Approaches. ERP Life-Cycle and SDLC. ERP Implementation Cost and Time, ERP Project Management, Training. **Implementation Stakeholder's Roles and Responsibilities:** Vendors, Consultants, Top Management and End-Users.	**10 Hrs**
Unit-III	**ERP Modules:** Finance, Production Planning, Material Management, Control & Maintenance ,Sales & Distribution, Human Resource Management (HRM),Inventory Control System, Quality Management, Marketing, Customization.	**10 Hrs**
Unit-IV	**ERP Auditing and Evaluation:** Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP) **ERP Auditing:** Process and Framework. **ERP Application:** ERP and E–Commerce – ERP and Internet, ERP and Cloud Computing. **ERP Vendors:** SAP, BAAN, Oracle, PeopleSoft.	**10 Hrs**

7

Text Book and References:

- ERP: A Managerial Perspective Book Description, Sadagopan S, Tata McGraw Hill.
- ERP Ware: ERP Implementation Framework - Garg & Venkitakrishnan.
- ERP Concepts and Planning - Garg & Venkitakrishnan 2011
- ERP Demystified, By Alexis Leon, Tata McGraw Hill.
- Concepts in Enterprise Resource Planning, By Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, Thomson Learning, 2001.

Digital Reference:

- en.wikipedia.org/wiki/Enterprise_resource_planning
- http://www54.sap.com/solutions/bp/erp.html
- http://www.saptechnical.com/
- http://www.infor.com/solutions/erp/

8

Elective I
Title of the Subject: Mobile Computing
Course Code: MCA 331

Teaching Scheme:
Lectures: 4hrs/week

Examination Scheme:
Theory Paper: 80 Marks [3 hrs]
Class Test: 20 Marks

Objectives:

- To understand wireless technologies with their origin, architecture and special features.
- Familiarize students with open source tools for mobile application development.
- Synthesize between communication bearers available in network market.

UNIT I 10 Hrs

Introduction:
Principle of Cellular communication, Overview 1G, 2G, 3G, 4G, 5G technologies, Applications- Vehicles, Emergencies, Business, Replacement of Wired Networks, Infotainment and more, Location dependant services, Mobile and wireless devices, Mobile O.S.

Wireless Transmission:
Frequencies for radio transmission, regulations, signals, Antennas, Signal Propagation, Path loss of radio signals, Multipath Propagation, Additional Signal Propagation, Multiplexing- SDM, FDM, TDM, CDM. Modulation- Amplitude Shift Keying, Advanced Phase Shift Keying, Multicarrier Modulation, Spread Spectrum, Frequency Hopping Spread Spectrum, Cellular Systems.

UNIT II 10 Hrs

Medium Access Control:
Motivation for a specialized MAC- Hidden and exposed terminals, Near and Far Terminals, SDMA, FDMA, TDMA, CDMA

Telecommunication System:
GSM- Mobile Services, System Architecture, Radio Interface Protocols, Localization and Calling, Handover, Security, GPRS- Mobile services, system Architecture, New Data Services- CDPD, VOIP, WLL, Bluetooth Technology

Wireless LAN:
Infrared vs. Radio transmission, Infrastructure and ad-hoc networks, IEEE 802.11- System Architecture, Protocol Architecture, Physical layer, MAC layer, MAC Management

UNIT III 10 Hrs

Mobile Network Layer:
Goals, Assumptions and Requirements, Entities and Terminology, IP Packet Delivery, agent Advertisement and Discovery, Registration, Tunneling and Encapsulation, Optimization, Reverse Tunneling, IPV4 and IPV6

Mobile Transport Layer:
Traditional TCP, Congestion control, Slow start, Fast transmit-fast recovery, Implications on Mobility, Indirect TCP, Snooping TCP, Mobile TCP.

Wireless ATM:
Motivation for ATM, Wireless ATM working group, WATM Services, Reference Model, Generic Reference Model, Functions.

9

Wireless Application Protocol:
Architecture, WDP, WTLS, WSP, WAE.

UNIT IV 10 Hrs

Android Application Development:
Overview of Android, Devices Running Android, Why Develop for Android, Features of Android Architecture, Libraries.
Studying Components, Adding Resources, Android Activities, Android Layouts, UI controls- Alert Box, Check Box, Radio Button, List View, Gallery View, Timer, Date and Time Picker.
Database Connectivity

Text/Reference Books:

1. Jochen Schiller, Mobile Communication, Pearson Education Asia.
2. Yi Bing Lin, "Wireless and Mobile Network Architectures", John wiley.
3. Asha Mehotra, GSM System Engg, Artech House.
4. Hello Android, Introducing Google's Mobile Development Platform- ED Burnette pragmatic programmers, ISBN:978-1-93435-617-3.
5. Sams teach yourself Android application development, Lauren Dercy & Shande Conder, Sams publications.

10

Elective I
Title of the subject: Embedded System
Course Code: MCA 332

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objective:

- To study various aspects of Embedded Systems design.

Prerequisite:

Student must aware of microprocessor programming using ALP, Microprocessor Architecture, Instruction set and machine code generations, and C Programming.

Unit I **Introduction to Microprocessors and microcontrollers** 10 Hrs

Architecture of 16 bit processors(8086), Physical Memory Organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities. Addressing Modes of 8086,80186,80286,80386,80486, Pentium, Case Study on Advanced Multiprocessors
Microcontrollers 8051 family – Introduction, Architecture, Memory Organization, Instruction Set –Programming

Unit-II **Introduction to Embedded Systems**: 10 Hrs

Overview of embedded systems, features, Requirements and applications of embedded systems, Recent trends in the embedded system design, Processor Embedded, Examples , Classification of Embedded Systems. Formalization of System Design, Design Process and Design Examples.

Unit-III **Embedded System Architecture**: 10 Hrs

Common architectures for the ES design, Embedded software design issues , Basics of 8 – bit RISC microcontroller (PIC), Block diagram, Addressing modes, Instruction set, Timers, Counters, Stack operation, Programming using PIC controller,
Advanced Embedded Processors: basics of 32 – bit microprocessor (ARM), ARM Embedded Systems, ARM Processor Fundamentals, Instruction Set, Assembly Code, Digital Signal Processing, Exception and Interrupt Handling, Firmware.

Unit-IV **Embedded Software**: 10 Hrs

Embedded Software in a System, introduction to development and testing tools. The Compilation Process, Native Vs Cross-Compilers, Runtime Libraries, Writing a Library, Using Alternative Librarie. Downloading, Emulation and Debugging techniques. Programming in embedded environment, Programming for various microcontrollers families such as Intel 8051, PIC, and ARM. Introduction to RTOS, efficient code writing.
Interfacing and Communication Links: Serial interfacing, SPI / micro wire bus, I2C bus, CAN bus, PC parallel port, IRDA data link, PCI bus architecture.

Books:

1. Embedded Systems: Architecture, Programming and Design, Raj Kamal, McGraw Hill
2. "Embedded System Design – A Unified Hardware / Software. Introduction", Frank Vahid/Tony Givargis, Wiley Student Edition.
3. "An Embedded Software Primer" David Simon, Pearson.

Reference Books:

1. "Specification and Design ofEmbedded Systems", Daniel Gajski, Frank Vahid, Sanjiv Narayan, & Jie Gong, Pearson
2. "Introduction to Embedded Systems", K V Shibu, McGraw-Hill
3. "Embedded Realtime System Programming", . Iyer and Gupta, McGraw-Hill

12

Title of Subject: LAB I Image Processing and RS-GIS
Course Code: MCA 321

Teaching Scheme:
Practical: 2 hrs/week

Examination Scheme:
Practical: 25 Marks
Term Work: 25 Mark

1. Write program to read and display digital image using MATLAB or SCILAB
   - Become familiar with SCILAB/MATLAB Basic commands
   - Read and display image in SCILAB/MATLAB
   - Resize given image
   - Convert given color image into gray-scale image
   - Convert given color/gray-scale image into black & white image
   - Flow control and LOOP in SCILAB

2. To write and execute image processing programs using point Processing method
   - Obtain Negative image
   - Obtain Flip image
   - Thresholding

3. To write and execute programs for image arithmetic operations
   - Addition of two images
   - Subtract one image from other image
   - Calculate mean value of image
   - Different Brightness by changing mean value

4. To write and execute programs for image logical operations
   - AND operation between two images
   - OR operation between two images
   - Calculate intersection of two images
   - Water Marking using EX-OR operation
   - NOT operation (Negative image)

5. To write a program for histogram calculation and equalization
   - Standard MATLAB function
   - Program without using standard MATLAB functions
   - Use Simulink to plot histogram of colour image

6. Write and execute program for image morphological operations
   - Erosion and dilation

7. Practical of RS-GIS on NET SAR and POL SAR tools.

8. Practical of RS-GIS on NET SAR and POL SAR tools.

9. Practical of RS-GIS on NET SAR and POL SAR tools.

10. Practical of RS-GIS on NET SAR and POL SAR tools.

13

Title of Subject: LAB II Cyber security
Course Code: MCA 322

Teaching Scheme:
Practical: 2 hrs/week

Examination Scheme:
Practical: 25 Marks
Term Work: 25 Marks

Assignment 1

1. Which command is used for finding host/domain name and IP address ?
2. Which command will display the assigned IP address of ETHERNET adapter?
3. Which command is used for checking the network connectivity ?
4. Which command is used for finding all the ip addresses of a given domain name ?
5. Which command is used for finding connection to and from the host ?
6. Which command is used to view user information, user's login name, real name, terminal na me and write status ?
7. Which command is used for mapping name to IP addresses?
8. Which command is used for connecting to a host on a particular port ?
9. Which command is used to make a connection to a remote machine and execute
10. Programs as if one were physically present ?
11. What are the text based web browsers available through command line ?

Assignment 2

1. Which command is used for downloading a website for off-line view ?
2. Which command is used for displaying or manipulating the ARP (Address Resolution Protocol) information on a network device or computer. ?
3. Which command is used for checking/starting/stopping networking services, users, messaging, configuration and so on... ?
4. Which command is a packet filtering configuration program used for manipulating netfilter kernel based firewall ?
5. Which command is used for showing network statistics ?
6. Which command is used for displaying and manipulating routing table ?
7. Which command is used to monitor access control for supported services ?
8. Which command is used to view network traffic ?
9. Which command is used to change your hostname ?
10. Which command is used for an interface IP address ?

Assignment 3

1. Which command is used for controls access to daemons at the application level, rather than at the IP level ?
2. Which command is used for connecting to a host with encryption.
3. In which file, we can find the local look up server used by the browser
4. Command used to find out the intermediate nodes between the host and the server is
5. Which command used to find out the intermediate domain name nodes between the host and t he server ?
6. Command used to follow all the information a DNS server has about a particular domain
7. The command is get documents/files from or send documents to a server

8. How to check if a particular interface is up and running?
9. This command is used to list info about machines that respond to SMB name queries (for example windows based machines sharing their hard disk's).
10. This command is used to look up the contact information from the "whois" databases, the ser vers are only likely to hold major sites. Note that contact information is likely to be hidden or restricted as it is often abused by crackers and others looking for a way to cause malicious da mage to organisation's.
11. It allows you to send and receive files between two computers.
12. Another part of the ssh package. This command is similar to ftp but uses an encrypted tunnel t o connect to an ftp server and is therefore more secure than just plain ftp.
13. Part of the ssh package. Allows you to copy files from one computer to another computer.
14. nfs - nfs fstab format and options
15. where to look to find out the services which are available to the system .
16. where to look to find out the list of protocols which are available to the system along with thei r port numbers .
17. To listing the iptables of your linux system -
18. How to know if a service is running or not -
19. How to Enable IP Forwarding in Linux

Assignment 4

1. Study Manual for Wire Shark

Assignment 5

Perform the following using Wireshark

1. Identify the first 2 packets (i.e. their packet numbers) containing HTTP GET request.
2. What webpage was visited in the above 2 packets?
3. What version of HTTP was used?
4. What is the destination IP address in the above packets?
5. List the source and destination ports of the packets travelling from the client to the server in the above packets?
6. In the HTTP server's response, look at the information sent about the server. What server software was used?
7. What are the IP addresses of the server?

Assignment 6

Perform the following using Wireshark

1. What are the MAC addresses of the client and server?
2. How many WebPages (not websites) have been opened?
3. What is the time difference between first HTTP GET and the first HTTP response (OK)?
4. Count the total number of HTTP GET requests.
5. What is the time difference between the first and last HTTP GET requests? Hint: Follow a similar procedure as mentioned previously.
6. How may packets were exchanged between the server (corresponding to the both IP addresses) and the client? (Note: Their sum must be equal to the total no. of packets)

7. Find the total no. of HTTP requests sent by the host spongebob.wikia.com.

Assignment 7

1. SQL Injection

Assignment 8

1. Give a short note on OSSEC?
2. What are the components of OSSEC
3. List the few key features of OSSEC.
4. What are the types of agent in OSSEC?
5. What are the roles of Manager (server) and an Agent in OSSEC?
6. What is Syscheck in OSSEC?
7. What is LIDS and HIDS?

Assignment 9

1. Which type of log is used by pflogsumm.
2. Which type of log is used by webalizer.
3. What are the different types of log is/are used by AWStats
4. pflogsumm analyzes is a mail/weblog or both ?
5. webalizer analyzes is a mail/weblog or both ?
6. command line option used for increment log analysis, mention domain name and squid log file with webalizer.
7. AWStats tools written in which language?

Assignment 10

1. Steps for setting up Cyber Security in organization.

References:

1. http://www.ossec.net/
2. www.linuxmanpages.com/man1/**pflogsumm**.1.php
3. www.**webalizer**.org/
4. http://www.computersecuritystudent.com/SECURITY_TOOLS/DVWA/

16

Title of Subject: LAB III Research Methodology
Course Code: 323

Teaching Scheme:
Practical: 2 hrs/week

Examination Scheme:
Term Work: 50 Marks

1. **Introduction to Research Methodology**
   Motivation and objectives – Research methods *vs* Methodology. Types of research – Descriptive *vs*. Analytical, Applied *vs*. Fundamental, Quantitative *vs*. Qualitative, Conceptual *vs*. Empirical.
2. **Defining Research problem and basics of principles of experimental design.**
   Defining and formulating the research problem -Selecting the problem - Necessity of defining the problem - Importance of literature review in defining a problem
3. **Guidelines for reading Research papers**
   The student will be given sample papers and guided how to read research papers.
4. **Guidelines on writing literature review**
   Primary and secondary sources – reviews, treatise, monographs-patents – web as a source – searching the web - Critical literature review – Identifying gap areas from literature review
5. **Methods of data collection**
   Collection of primary data, Observation method, Interview method, Collection of data through questionnaire and schedules, Collection of secondary data, Selection of appropriate method for data collection.
6. **Statistic in Research methodology**
7. **Hypothesis testing**
8. **Report and Thesis writing**
   Structure and components of scientific reports -Types of report – Technical reports and thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables - Bibliography, referencing and footnotes.
9. **Presentation Skills**
   Oral presentation – Planning – Preparation – Practice – Making presentation – Use of visual aids - Importance of effective communication –.
10. **Application of results and ethics**
    Environmental impacts - Ethical issues -ethical committees - Commercialisation – Copy right – royalty - Intellectual property rights and patent law – Trade Related aspects of Intellectual Property Rights – Reproduction of published material – Plagiarism - Citation and acknowledgement - Reproducibility and accountability.

REFERENCES

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. *An introduction to Research Methodology*, RBSA Publishers.
2. Kothari, C.R., 1990. *Research Methodology: Methods and Techniques*. New Age International. 418p.
3. Sinha, S.C. and Dhiman, A.K., 2002. *Research Methodology*, Ess Ess Publications. 2 volumes.
4. Trochim, W.M.K., 2005. *Research Methods: the concise knowledge base*, Atomic Dog Publishing. 270p.
5. Wadehra, B.L. 2000. *Law relating to patents, trade marks, copyright designs and geographical indications*. Universal Law Publishing.

17

Title of the Subject: Lab IV - Project
Course Code: MCA 324

Teaching Scheme:
Practical: 4 Hrs/ week

Examination Scheme:
Practical Exam: 50 Marks
Term Work: 50 Marks

Objectives:

The students have gained conceptual and practical knowledge of various subjects from Semester I to Semester IV. The Objective of this paper is to motivate students to undertake the projects in the varied Computer technology of their interest and area of expertise they need to develop.

Guidelines for Major Project:

1. Allow minimum 2 to maximum 4 students per project group
2. Take the topic from students in first 15 days from the start of the semester.
3. Follow Software Development Life Cycle Phase for project development.

The nature of the project can in industry or research project.

Major Project shall follow the steps below:

1. Define the problem with specifications
2. Define the functionality of the project
3. Design a solution for the project
4. Implement the solution.
   (Also keep a record of total number of man hours spent for the project.)
5. Present and evaluate the project.

The report of this project is to be submitted in typed form with Spiral Binding. The report should have all the necessary diagrams, charts, printouts and source code. The work has to be done in groups.

The **suggestive format** of the report is as follows:
(Only one report should be submitted per group as a part of term work submission.)

Title of the Project:
Names & Roll Numbers of the students:
Name of the guide:
Chapter 1: Introduction
Chapter 2: Requirement specifications
Chapter 3: Design and implementation
(This chapter will include the entire design process with necessary UML diagrams)
Chapter 4: Performance Analysis
(This chapter will include Testing and evaluation process.)
Chapter 5: Conclusions
(This should include conclusion & future scope)

Desired:

1. It is desired that the students should undertake live project .
2. It is desired that they make use of Opens Source technologies
3. It is also desired that they should undertake research project in the field of Computer Science and applications. In this case the format of report will be as per the research requirement specification.