DETAILED SYLLABUS

OF

MASTER OF SCIENCE IN

INFORMATION & CYBER SECURITY

TWO YEAR DEGREE

M.SC.(ICS)
(EFFECTIVE FROM 2020)

Eligibility Criteria: Undergraduate (or Postgraduate) Degree with Computer or Electronics specialization

OR

Engineering Degree (Any Discipline/Branch)

OR

Undergraduate degree along with Diploma in Computers from University or Govt. Institute

MAKHANLAL CHATURVEDI NATIONAL UNIVERSITY OF JOURNALISM & COMMUNICATION

B-38, PRESS COMPLEX, M.P. NAGAR ZONE–I, BHOPAL-462011

	M.Sc. ICS (Information & Cyber Security) 2 Years Degree Programme Scheme-2020-2022		
Semester	Program Core Course	Elective: Discipline Specific Elective (DSE)(Choose any One Paper per semester)	Ability Enhancement Compulsory Course (AECC)
	4 Papers (5 Credit)	1 Papers (5 Credit)	1 Papers (5 Credit)
I	• Foundation of Cyber Security • Linux Operating System * • Secure Electronic Commerce* • Object Oriented Programming with Java*	Database Management System OR Communicative English	Lab-I Based on *
II	• Information & Network Security * • Data Communication & Coding Theory • Operating System Security * • Cyber Crime & Law	Google Dorks & Penetration Testing* OR Web Development*	Lab-II Based on *
III	• Digital Marketing & Security* • Ethical Hacking * • Applications & Systems Security • Server Administration & Security*	IT Asset Security OR Secure Coding	Lab-III Based on *
IV	• Digital Forensic* • Server Hardening * • Disaster Recovery & Risk Management • Project Work	Python For Cyber Security* OR Cloud Computing & Security*	Lab-IV Based on *

MASTER OF SCIENCE (M.SC.) IN INFORMATION & CYBER SECURITY
COURSE STRUCTURE
SEMESTER – I

Subject Code	Subject Name	L	T	P	Load	Theory Marks	Internal Marks	Practical Marks	Total Marks
		Credits/Hours							
1MICS1	Foundation of Cyber Security	4/4	1/1	0/0	5/5	80	20	0	100
1MICS2	Linux Operating System *	4/4	1/1	-	5/5	80	20	0	100
1MICS3	Secure Electronic Commerce*	4/4	1/1	-	5/5	80	20	0	100
1MICS4	Object Oriented Programming with Java*	4/4	1/1	-	5/5	80	20	0	100
Electives: 1MICS5(A) 1MICS5(B)	Database Management System Communicative English	4/4	1/1	0/0	5/5	80	20	0	100
1MICS6	Lab-Iis based on * subjects above	0/0	0/0	5/10	5/10	0	20	80	100
Semester Totals		20/20	5/5	5/10	30/35	**400**	**120**	**80**	**600**

SEMESTER – II

Subject Code	Subject Name	L	T	P	Load	Theory Marks	Internal Marks	Practical Marks	Total Marks
		Credits/Hours							
2MICS1	Information & Network Security*	4/4	1/1	-	5/5	80	20	0	100
2MICS2	Data Communication & Coding Theory	4/4	1/1	0/0	5/5	80	20	0	100
2MICS3	Operating System Security*	4/4	1/1	-	5/5	80	20	0	100
2MICS4	Cyber Crime & Law	4/4	1/1	0/0	5/5	80	20	0	100
Electives: 2MICS5(A) 2MICS5(B)	Google Dorks & Penetration Testing* Web Development*	4/4	1/1	-	5/5	80	20	0	100
2MICS6	Lab-II is based on * subjects above	0/0	0/0	5/10	5/10	0	20	80	100
Semester Totals		20/20	5/5	5/10	30/35	**400**	**120**	**80**	**600**

Key: L-Lecture hours, T- Tutorial hours, P-Practical hours, * - Indicates subjects having Practical Exam.

SEMESTER - III

Subject Code	Subject Name	L	T	P	Load	Theory Marks	Internal Marks	Practical Marks	Total Marks
		Credits/Hours							
3MICS1	Digital Marketing & Security*	4/4	1/1	-	5/5	80	20	0	100
3MICS2	Ethical Hacking*	4/4	1/1	-	5/5	80	20	0	100
3MICS3	Applications & Systems Security	4/4	1/1	0/0	5/5	80	20	0	100
3MICS4	Server Administration & Security*	4/4	1/1	-	5/5	80	20	0	100
Electives: 3MICS5(A) 3MICS5 (B)	IT Asset Security Secure Coding	4/4	1/1	0/0	5/5	80	20	0	100
3MICS6	Lab-III is based on * subjects above	0/0	0/0	5/10	5/10	0	20	80	100
Semester Totals		20/20	5/5	5/10	30/35	**400**	**120**	**80**	**600**

SEMESTER – IV

Subject Code	Subject Name	L	T	P	Load	Theory Marks	Internal Marks	Practical Marks	Total Marks
		Credits/Hours							
4MICS1	Digital Forensics*	4/4	1/1	-	5/5	80	20	0	100
4MICS2	Server Hardening*	4/4	1/1	-	5/5	80	20	0	100
4MICS3	Disaster Recovery & Risk Management	4/4	1/1	0/0	5/5	80	20	0	100
4MICS4	Project Work	0/0	3/3	2/4	5/7	0	20	80	100
Electives: 4MICS5(A) 4MICS5(B)	Python For Cyber Security* Cloud Computing & Security*	4/4	1/1	-	5/5	80	20	0	100
4MICS6	Lab-IV is based on * subjects above	0/0	1/1	4/8	5/9	0	20	80	100
Semester Totals		16/16	8/8	6/12	30/36	**320**	**120**	**160**	**600**

Key: L-Lecture hours, T- Tutorial hours, P-Practical hours, * - Indicates subjects having Practical Exam.
General Instructions:

For passing the subject examination minimum 40% marks must be separately scored in Theory Paper, Practical Exams and Internal Evaluation for the subject.

SEMESTER -I
1MICS1- FOUNDATION OF CYBER SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT-I

Computer Generation, Block Diagram, Input/output Units, Input Devices, Output Devices , CPU, Memory, HDD, FDD, and other Storage Devices, Printer :Types, Scanner, Networking Concepts, LAN, WAN, MAN, HUB, Cables, Topology, Switch, Gateways, Router, DNS, IP address, Subnet, Windows Basics , Making Folders, Files, Copy, Paste, Typing in MS-words, Excel, Making Presentation in PowerPoint , IP Configuring, Software Installation, Games, Windows Control Panel, Printer Installation, Partition, HDD Geometry, FAT32, NTFS File System, Elementary Number Theory, Required LAB .Goals: To learn about the basics of computer devices, networking devices.

UNIT- II

Protocols TCP/IP, Ethernet, OSI, Token Ring, Token Bus, FDDI, Application Layer Protocols, Email, SMTP, FTP, HTTP, HTTPS , UDP, and all Cable Crimping, Subneting, Superneting, VLSM, Routing, Switching, VLAN, Modem ACL, SNAT, DNAT, IP Addressing, How Internet Works, How Data Travel within Network.

UNIT- III

Software Firewalls, Hardware Firewalls, Physical and Virtual Machines, KVM, Virtual Box, VMware, Virtualization, AWS, Network Simulator Cisco Packet Tracer, Network security: Firewall, Virtual Machines & Cloud Computing and it workings.

UNIT- IV

Linux Essentials: Basic commands, Shell, Directory Structure, Users, Groups, Permissions, Partitions. Goals: Journey of Linux operating system, familiarization with Linux and working with Linux command line.

UNIT- V

Servers, DNS, FTP, DHCP, SAMBA, Apache, ActiveDirectory, LDAP, Postfix.Goals: Working with Different Servers likeFile,Web, Mail, Centralized Users Servers

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Reference Books:

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1. William Stallings-Cryptography and Network Security: Principles and Practice-Pearson Publication
2. Chris Mc Nab-Network Security Assessment-O'reilly Publication 3rd edition
3. Michael Speciner and Radia Perlman-Network Security: Private Communication in a Public World -Pearson Publication
4. Chey Cobb-Network Security for Dummies
5. Charles P Pfleeger-Security in Computing -Pearson Publication.

1MICS2-LINUX OPERATING SYSTEM

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT – I

Linux Introduction, File System, Basic Features, Different flavors of Linux, Advantages, How to access Linux Files, Storage Files, Linux Standard Directories, Commands for Files and Directories CD, LS, CP, MD, RM, MKDIR, RMDIR, PWD, More, Less, Creating and Viewing files using Cat, File Comparisons – CMP & COMM, View files, Disk related Commands, Checking Disk Free Spaces.

UNIT–II

Understanding Shells, Processes in Linux, Connecting Processes with Pipes, Redirecting Input- Output, manual help, Background Processing, Managing Multiple Processes, Changing Process Priority with NICE, Scheduling of Processes at command, CRON commands, KILL, PS, WHO, SLEEP, Printing commands, touch, file related commands - WC, CUT, DD, etc. Mathematical Commands- BC, EXPR. Creating and editing files with VI& VIM editor. Simple filter commands – PR, HEAD, TAIL, CUT, PASTE, SORT, UNIQ, TR. Filter using regular expressions – GREP, EGREP, SED.

UNIT–III

Introduction to Shell Programming, Develop some shell programs, System Administration: Common Administrative Tasks, Configuration and Log files, Role of System Administrator, Installation Requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File System-Boot Block, Super Block, INODE, Data Blocks, Partitioning the Hard drive for Linux, Installing the Linux System, System startup and shut-down process.

UNIT–IV

Managing User Accounts-Addition & Deletion of users, Changing Permissions and Ownerships, Creating and Managing Groups, Modifying Group Attributes, Temporary Disable User's Accounts, Creating and Mounting File System, File Security & Permissions, Becoming Super User using SUDO., Host Name, Disk Partitions & Sizes, Users, Kernel, Backup and Restore Files, Installing and Removing Packages. KDE & GNOME Graphical Interfaces.

Basic Networking Administration: Setting Up LAN Using Linux, Choosing Peer to Peer Vs Client/Server Model, Setting Up Ethernet LAN, Configuring Host Computers, Checking Ethernet Connecting, Connecting to Internet, Common Networking Administrative Tasks, Configuring Ethernet, Initializing Ethernet Interface, IFCONFIG, NETSTAT and NETCONFIG Commands, TCP/IP Network, DNS Services.

UNIT-V

Installation, Configuration & Server Administration of In Linux, SSH,FTP Server, Apache Web Server, VNC Server, NFS.

Reference Books:

1. Fedora 9 and Red Hat Enterprise Linux Bible by Christopher Negus, Wiley India Ltd.
2. Linux Bible, 9ed, by Christopher Negus, Wiley India Ltd

3. Linux Administration, by Kogent Learning Solutions Inc., ISBN 13- 9789350044209, ISBN 10-935004420X, Wiley India
4. Unix & Shell Programming by Forouzan, Cengage Publications.

1MICS3- SECURE ELECTRONIC COMMERCE

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
	Credits/Hours						
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT–I

Introduction to E-Commerce: Defining Commerce; Main Activities of Electronic Commerce; Benefits of E-Commerce; Broad Goals of Electronic Commerce; Main Components of E-Commerce; Functions of Electronic Commerce – Communication, Process Management, Service Management, Transaction Capabilities; Process of E-Commerce; Types of E-Commerce; Role of Internet and Web in E-Commerce; Technologies used; E-Commerce Systems; Pre-Requisites of E-Commerce; Scope of E-Commerce; E-Business Models.

UNIT–II

E-Security: Security on the Internet; Network and Website Security Risks – Denial-of-Service attacks, Viruses, Unauthorized access to a computer network; Vulnerability of Internet Sites; Network and Website Security – Transaction Security and Data Protection, Security Audits and Penetration Testing; E-Business Risk Management Issues; Firewall – Network Policy, Advanced Authentication Mechanism, Packet Filtering, Application Gateways; Defining Enterprise Wide Security Framework.

UNIT-III

E-Payment Systems: Electronic Funds Transfer; Digital Token Based E-Payment Systems; Modern Payment Systems; Steps for Electronic Payment; Payment Security; Net Banking, Online Commercial Environments; Digital Currencies and Payment Systems; Offline Secure Processing; Private Data Networks, Security Protocols, On-Line Commerce Options: Company Profiles, Electronic Payment Systems: Digital Payment Systems-First Virtual Internet Payment System; Cyber Cash Model. On-Line Commerce Environments: Servers and Commercial Environments; Ecommerce Servers

UNIT- IV

Electronic Data Interchange: Benefits of EDI, EDI Technology, EDI Standards, EDI Communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System: Study and Examine the use of Electronic Payment System and the Protocols Used, Study Electronic Fund Transfer and Secure Electronic Transaction Protocol for Credit Card Payment. Digital Economy: Identify the methods of Payments on the net – Electronic Cash, Cheques and Credit Cards on the Internet.

UNIT- V

Operational process of DigiCash, eCash Trail; Using eCash-; Smart cards; Electronic Data Interchange: basics, EDI versus Internet and EDI over Internet. Strategies, Techniques and Tools-, Shopping Techniques and Online Selling Techniques-Implementation of E-Commerce: WWW.EBAY.COM - B2C Website – Registration, Time Factor, Bidding Process, Growth of eBay; PayPal – New Trend in Making Payments Online; National Electronic Funds Transfer.

Reference Books:

1. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
3. Efraim Turban, Jae Lee, David King, H.Michael Chung, "Electronic Commerce–A ManagerialPerspective", Addison-Wesley.
4. Elias M Award, "Electronic Commerce from Vision to Fulfilment", 3rd Edition, PHI, Judy Strauss, Adel El-Ansary, Raymond Frost, "E-Marketing", 3RDEdition, Pearson Education.
5. Awad, E., Electronic Commerce: From Vision to Fulfilment, 3/E, Prentice Hall, 2006, ISBN: 0-13-173521-7
6. Davis, W., Benamati, J., E-Commerce Basics: Technology Foundations and E-Business Applications, Prentice Hall, 2003, ISBN: 0-201-74840-1

1MICS4-OBJECT ORIENTED PROGRAMMING WITH JAVA

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT-I

Programming language Types and Paradigms, Computer Programming Hierarchy, Benefits, Flavors of Java, Features of Java Language, History of Java, JVM, Bytecode, Java Environment: Installing Java, Java Program Development, Java Source File Structure,Compilation, Executions Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Constants, Variables, Primitive Data types, Assignment Operator, Operators and Expressions, Statements - Decision making Branching and Looping labeled, Loops Statement, Jump Statements: break continue and return, Command Line Argument.

UNIT-II

Classes and Objects: Classes, Objects, Defining a Class, Adding Variables and Methods, Object Life time & Garbage Collection, Creating and Operating Objects, accessing class members, Constructor & initialization code block, Static Members, Access Control, Modifiers, Nesting of Methods, Inheritance and Polymorphism: Basics Types, Extending a Class, Using Super, Method Overloading, Method Overriding, Final Variables and Methods, Final Classes, Finalize Method, Abstract Methods and Classes, Visibility Control Use of "this " reference, Use of Modifiers with Classes & Methods, Generic Class

UNIT-III

One and Two Dimension Arrays, String Array, String and String Buffer Classes, Vectors, Wrapper Classes. Interfaces: Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, Packages: System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using Package, Adding a Class to a Package, Hiding Classes. Exception Handling: Introduction to Exception Handling, Try-Catch, Finally, Throws, Throw. Java Thread Model: Life Cycle of a Thread, Thread Class, Thread Priorities

UNIT-IV

Applet Programming :   Creating and Executing Java Applets, Inserting Applets in a Web Page, Applet Tag, Local and Remote Applets, Applets Vs. Applications, Applets Life Cycle. AWT Classes, Swing Classes, Event Handling, AWT Programming: Working with Windows, Graphics and Text, Using AWT Controls, Layout Managers and Menus, Handling Image, Animation, Sound and Video. Java Swing: JApplet, Icons and Labels, Text Fields, Buttons, Radio Buttons, Check Boxes, Combo Boxes, List Boxes, Tabbed and Scroll Panes, Tables. Event Handling, Event Manager

UNIT-V

I/O Stream : Introduction of I/O Stream, Types of Streams, Stream Class Hierarchy, Using File Class, Byte Streams Vs Character Streams, Text file Vs Binary File, Standard I/O Streams, and Random Access File, Serialization. J2EE: Introduction of J2EE, Web Application Basics, Architecture and Challenges of Web Application, Servlet, Servlet Life Cycle, Developing and Deploying Servlets.

Reference Books:

1. E. Balagurusamy "Programming with Java a Primer"TMH ISBN-13: 978-0-07-061713-1
2. Patrick Naughton and Herbert Schildt "Java: the Complete Reference" TMH Publication ISBN 0-07-463769-X.
3. Yashavant kanetkar "Let us Java" BPB Publications.
4. Ivan Bayross "Web Enabled Commercial Application Development Using HTML DHTML JavaScript Perl CGI" BPB Publications
5. Cay Horstmann "Big Java" Wiley Publication
6. Peter Norton "Java Programming" Techmedia Publications.
7. Joseph Weber "Using Java 1.2" PHI Isbn-81-203-1558-8.

1MICS5(A)-DATABASE MANAGEMENT SYSTEM

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
		Credits/Hours					
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT - I

Introduction to Database System : Data - Database Applications - Evolution of DB & DBMS - Need for Data Management, Introduction and Applications of DBMS, File Systems Versus Database Systems, Data Models, DBMS Architecture, Data Independence, Data Modeling using Entity-Relationship Model, Enhanced ER Modeling.

UNIT - II

Relational Database Concept and Design: Introduction to Relational Database, Structure of Relational Database, Relational Model Terminology, Domains, Attributes, Tuples, Relations, Relational DB Schema. Relational Algebra: Basic Operations, Selection and Projection, Set Theoretic Operations Union, Intersection, Set Difference and Division, Join operations: Inner and Outer Join, Left outer, Right Outer and Full Outer Join.

UNIT – III

Relational Database design, Functional Dependency, Definition, trivial and Nontrivial FD, Normalization 1Nf, 2NF, 3NF, Decomposition using FD Dependency Preservation, BCNF, Multi Valued Dependency, 4NF, Join dependency and 5NF.

Database Storage and Querying -Basic Concepts of Indexing and Hashing Query Processing, Measures of Query Cost, Query Processing for Select, Sort Join Operations, Basics of Query Optimization.

UNIT - IV

Concurrency, Recovery and Security -Concurrency Control: Definition of Concurrency, Lost Update, Dirty Read and Incorrect Summary Problems due to Concurrency. Concurrency Control Techniques: Overview of Locking, Two Phase Locking. Timestamp ordering, Multi-Versioning, Validation Recovery concepts, Shadow paging, Log Based Recovery, Elementary concepts of Database security: system failure, Backup and Recovery Techniques, authorization and authentication.

UNIT - V

Introduction to Current Trends – Centralized and Client Server Architectures, Distributed Databases, Object Oriented Database, Spatial & Temporal Databases, Data Mining & Warehousing, Data Visualization, Mobile Databases, OODB & XML Databases, Multimedia & Web Databases, Database security.

Reference Books:

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database Systems Concepts", 7th Edition, McGraw Hill .
2. Rajesh Narang "Database management System" PHI.
3. Ramakrishnan and Gherke, "Database Management Systems", TMH.
4. R. Elmarsiand SB Navathe, "Fundamentals of Database Systems", Pearson,5th Ed.
5. Singh S.K., "Database System Concepts, design and application", Pearson Education
6. Bipin Desai, "An Introduction to database Systems", Galgotia Publications.

1MICS5(B)- COMMUNICATIVE ENGLISH

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT-I

The Process of Communication: Communication, Process of Communication, Barriers of Communication, Different Types of Communication, Characteristics and Conventions of Conversation, Conversational Problems of Second/Foreign Language Users, Difference Between Conversation and Other Speech Events

UNIT- II

Telephone Techniques: Speaking and Listening, Conference Calls, Vocabulary Building, Writing, Grammar and Usage, Pronunciation, Job Applications and Interviews: Reading, Curriculum Vitae, Preparing for an Interview, Listening and Speaking in the Interviews Group Discussions: Group-Discussion, Study Skills, Language Focus, Speaking.

UNIT- III

Soft Skills Practice, Personality Development, Participating in Group Discussion and Job Interviews, Time Management Presentation Skills, Leadership Skills, Assertiveness, Lateral Thinking, Team Work and Interpersonal Skills, Emotional Intelligence, Self-Confidence and Courage, Attitude Presentation Skills: Presentation Skills, Importance of Body Language in Presentations, Pronunciation, Visual Aids, Podium Panic, Speaking

UNIT- IV

Managing Organizational Structure: Role of a Manager, Leadership, Language Focus, Writing Reports, Pronunciation, Meetings: Successful Meeting, One to One Meeting, Editing, Criteria for Successful Meetings, Reporting Verbs, Memos, Taking Notes and Preparing Minutes: Taking Notes, Preparing Minutes, Grammar

UNIT- V

Functional Grammar- Tenses: Simple Present, Progressive Perfect, Present Perfect Progressive Along-with Past Tense and Indications of Futurity Reported Speech, Modals: Will, Shall Should, Would and Others Voice: Active and Passive

Reference Books

1. Darer. Shankar-Communication Skills in English Language
2. Dr. Uremia Rai and S. M. Rai - Business Communication
3. B. K. Das- an Introduction to Professional English and Soft Skills
4. Barun K. Mitra- Personality Development and Soft Skills
5. Shashi kumar and Dhameja -Spoken English
6. Raymond Williams- English Grammar
7. Wren and Martin -English Grammar and Composition
8. Justin Seeley -Designing Presentation
9. Laura Bergelles- Public Speaking Foundations
10. M.a.K. Halliday- Spoken and Written Language
11. B Balasubriamaniam - Phonetics for Indian Students
12. R C Sharma- Business Correspondence
13. Dowel Jones- the Handbook of English Phonetics

1MICS6- LAB-I

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
	Credits/Hours						
0/0	0/0	5/10	5/10	0	20	80	100

List of Practical Using Linux/Ubuntu LTS version:

1. Kali Linux: Basic Linux commands
   - LS, CD, PWD
   - MKDIR, RM, MV, CP, CAT, NL
   - MORE, LESS, HEAD, TAIL
   - WHICH, WHEREIS, LOCATE
   - FIND, XARGS
   - WC, GREP, REGULAR EXPRESSION
   - CUT, PASTE, TR
   - SORT, UNIQ, JOIN
   - COMM, DIFF, PATCH
   - DF, DU, TIME
   - IFCONFIG COMMAND, PING COMMANDS

2. Write a shell script that prints "Shell Scripting is Fun!" on the screen

3. Modify the shell script from exercise 1 to include a variable. The variable will hold the contents of the message "Shell Scripting is Fun!"

4. Store the output of the command "hostname" in a variable. Display "This script is running on _." where "_" is the output of the "hostname" command.

5. Write a shell script to check to see if the file "file_path" exists. If it does exist, display "file_path passwords are enabled." Next, check to see if you can write to the file. If you can, display "You have permissions to edit "file_path.""If you cannot, display "You do NOT have permissions to edit "file_path""

6. Write a shell script that displays "man","bear","pig","dog","cat",and "sheep" on the screen with each appearing on a separate line. Try to do this in as few lines as possible.

7. Write a shell script that prompts the user for a name of a file or directory and reports if it is a regular file, a directory, or another type of file. Also perform an ls command against the file or directory with the long listing option.

8. Modify the previous script to that it accepts the file or directory name as an argument instead of prompting the user to enter it.

9. Write the shell script that renames all files in the current directory that end in ".jpg" to begin with today's date in the following format: YYYY-MM-DD. For example, if a picture of my cat was in the current directory and today was October 31,2016 it would change name from "mycat.jpg" to "2016–10–31-mycat.jpg".

10. Write the shell script that displays one random number on the screen and also generates a system log message with that random number.Use the "user" facility and "info" facility for your messages.

11. Read in two numbers from the keyboard and print their sum (see the read, echo and let commands in the shell manual page).

12. Write a shell script that given a person's uid, tells you how many times that person is logged on. (who, grep, wc)

13. Write a shell script called lsdirs which lists just the directories in the current directory (test).

14. Write a shell script called see taking a filename name as argument which uses ls if the file's a directory and more if the file's otherwise (test)

15. Write a shell script that asks the user to type a word, then tells the user how long that word is. (read, wc)

16. Write a shell script that takes a uid as an argument and prints out that person's name, home directory, shell and group number. Print out the name of the group corresponding to the group number, and other groups that person may belong to. (groups, awk, cut. Also look at /etc/passwd and /etc/groups).

List of Practical Using OOPS in Java:

17. Write a Program in Java to Calculate the Simple Interest.
18. Write a Program in Java to Calculate Sum of Two Numbers Input from Command Line Argument.
19. Write a Program in Java to Calculate Area of Circle Using Scanner Class.
20. Write a Program in Java to Calculate Square Root of a Number.
21. Write a Program in Java to Display Name, Age, Calendar and Salary of a Person Input from the Keyboard.
22. Write a Program in Java to Display Grading of Student When His Percentage is Input from Keyboard.
23. Write a Program in Java to Display Odd Number from 1 to 100.
24. Write a Program in Java to Display the Following Pattern.

    1
    2 2
    3 3 3
    4 4 4 4
    5 5 5 5 5

25. Write a Program in Java to Display the Following Pattern Using Function.

    1
    2 2
    3 3 3
    4 4 4 4
    5 5 5 5 5

26. Write a Program in Java to Display the Following Pattern Using Function.

    1
    1 2
    1 2 3
    1 2 3 4
    1 2 3 4 5

27. Write a Program in Java to Display the Following Pattern Using Function.

    1
    2 3
    4 5 6
    7 8 9 10
    11 12 13 14

28. Write a Program in Java to Calculate the Factorial of a Number.
29. Write a Program in Java to Determine Whether a Number Input from Keyboard is Prime Number Or Not.
30. Write a Program in Java to Display the Prime Numbers from 1 to 500 Using Function.
31. Write a Program in Java to Show Accessing Class Members and use a Dot(.).
32. Write a Program in Java to Show Multilevel Inheritance.
33. Write a Program in Java to Show Single Inheritance.
34. Write a Program in Java to Concatenate Two Strings Without Using Library Function.
35. Write a Program in Java to Make First Alphabet Capital of Each Word in a String.
36. Write a Program in Java to Get the Last Index of Any Given Character in a String.
37. Write a Program in Java to Reverse Words of a String.
38. Write a Program in Java to Find Occurrences of Each Character in a String.
39. Java Program to Get String and Count Number of Words in Provided String.
40. Write a Program in Java to Check Given String is Palindrome String Or Not in Java.
41. Write a Program in Java to Reverse Each Word of Given String.
42. Write a Program in Java to Get Sub String from a Given String.
43. Java Program to Convert String to Lowercase and Uppercase.

List of Practical Using Secure E-Commerce:

SEMESTER -II
2MICS1- INFORMATION AND NETWORK SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
	Credits/Hours						
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT-I

Introduction: Security Concepts:-Confidentiality, Integrity, and Availability , Threats, Risks, Sources of Threats, Attacks Classification, Cryptography, Confusion vs. Diffusion, Stream Ciphers vs. Block Ciphers, Classical Cryptography, Objectives of Cryptography, Secret-Key and Public-Key Cryptography, Cryptanalysis, RC5, Blowfish, Required Lab Goals: information and data security, methods of authentication, type of keys used in authentication.

UNIT- II

Block Ciphers, Block Cipher Principles, Feistel Networks, S-Boxes And P-Boxes, Block Cipher, DES, Elementary, Number Theory, Prime Numbers, Factoring, Key Exchange: Diffie-Hellman, Public-Key Encryption: RSA, Entity Authentication: Passwords, Challenge-Response Algorithms, Digital Signature, Digital Certificates, X509 Certificates, SSL, HTTPS, and IPSEC, OpenSSL Cryptographic Toolkit, Required Lab goals: Different Algorithms For Generating Keys And Using these Keys For Authentication In Order To Improve The Security.

UNIT- III

Introduction to Hash Function: Message Digest: MD5 and SHA-1, Attacks on Hash Functions, MD family, SHA family, Trapdoor functions, Digital Signatures, Overview of GPG, Required LAB Goals: Learn about different ways to store passwords, using Hash functions.

UNIT- IV

Network Issues, Public-Key Infrastructure (PKI), Kerberos, Encryption using Non-Cryptographic Tools (VI, Zip), Authenticationprinciples and methods, passwords, Two-factor authentication, Steganography, watermarks, firewalls and web security, Intruders and viruses, trusted system, password management, zero knowledge protocols, malware – privacy, Honeypot, Defense programming, web application vulnerability, DHS, attack, semantic attack, DOS, DDOS, wireless attack, Intrusion detection System, TrueCrypt Tool, [Required LAB] Goals: Learn About PKI Which is used to facilitatethe Secure Electronic Transfer of Information for a Range of Network Activities Such as E-Commerce, Internet Banking and Confidential Email.

UNIT- V

SE Linux: System Security, Contexts, Labels, How SELinux Enhances System Security. [Required LAB]Goals: A Kernel Security Module that Provides a Mechanism for Access Control.

Reference Books:

1. William Stallings, Cryptography and Network Security, PHI.
2. Calabrese, Info Security Intelligence-Cryptography Principles Appl- Cengage Learn.
3. Krawetz- Introduction to Network Security, Cengage Learning.
4. Bruce Schneier, Applied Cryptography, John Wiley and Sons Mark Stamp,
5. Mark Stamp, Information Security: Principles and Practice, John Wiley and Sons

2MICS2- DATA COMMUNICATION & CODING THEORY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Data Communications: Define Communication, Uses of communication; General Block Diagram of Communication System, Types of communication, Data Communications, Applications, Internet. **Data Transmission:** Maximum Data Rate of Channel, Electromagnetic Spectrum, Electromagnetic Waves, frequency and wave length, bandwidth, bandwidth and channel capacity, Modulation, Transmission Impairments, Channel Capacity, Attenuation, Delay Distortion, Noise -Channel capacity: Nyquist Bandwidth, Shannon's Capacity formula.

UNIT-II

Transmission Media: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission, Optical Fibre -Physics & Velocity of Propagation of Light, Advantages & Disadvantages, UnGuided Media: Electromagnetic Polarization, Attenuation and Absorption, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Microwave, Infrared & Satellite Communication System.

UNIT-III

Digital Data Communication Techniques: Digital Communication, Advantages of Digital Communication, Nyquist Theorem, Sampling Theory, Analog to Digital Conversion -Pulse Code Modulation (PCM), Delta Modulation (DM); Encoding of Digital Signals, Multiplexing and Modulation of Digital Signals, Digital Radio, Digital Amplitude Modulation, Frequency Shift Keying (FSK), Phase Shift Keying (PSK)

UNIT-IV

Data Link Control Protocols: Types of Errors, Error Detection, Error Correction, Flow Control, Error Control, High-Level Data Link Control (HDLC) Coding – Coding Schemes – Block Code , Parity Check – Cyclic Codes – CRC– Check Sum – Forward Error Correction –Framing – Character Oriented, Bit Oriented – Flow and Error Control – DLL Protocols – Simple, Stop and Wait.
Multiplexing: Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing, Statistical Time-Division Multiplexing, Asymmetric Digital Subscriber Line, xDSL.

UNIT-V

Coding Theory : Overview of Coding Theory, Basic Concepts - Entropy and Mutual information; Lossless Source Coding – Source entropy rate; Huffman code; Universal Coding; Noisy Channel Coding - Channel Capacity; Random Channel Codes; Lossy Source Coding - Rate- Distortion Functions; Random Source Codes; Joint Source-Channel Coding. **Source Coding:** Text, Audio and Speech: Adaptive Huffman Coding, Arithmetic Coding, Error control Coding- Block codes: Definitions and Principles: Hamming weight, Hamming distance.

Reference Books:

1. Brijendra singh Data Communication and Computer Networks, PHI
2. Behrouz Forouzan ,Data Communications and Networking , Tata McGraw-Hill

3. Andrews S. Tanenbaum, David J Wetherall; Computer Networks; Pearson Education
4. William Stallings, Data & Computer Communications, PHI,
5. Mark Kelbert(Author), Yuri Suhov, Information Theory and Coding by Example, Cambridge University Press,2013
6. Simon Haykin and Michael Moher, Communication Systems, 5th Edition, Wiley, 2010
7. T.M. & Thomas, J.A. (2006). Elements of information theory. New York: Wiley.
8. Adamek, Foundations of coding, Wiley Interscience, 1991.
9. T. M. Cover and J. A. Thomas, Elements of information theory, Wiley, 1991.

2MICS3-OPERATING SYSTEM SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours				
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Operating System: Introduction, Structure and Operations, Protection and Security, Process Management, Process Scheduling, Last –Come- First- Serve, First-Come-First-Serve, Shortest Job First, Round- Robin, Inter Process Communication, Multi Threading Models, Semaphores, Deadlocks, Mutexes, Critical Section Problem.

UNIT II

Memory Management: Swapping, Segmentation, Page Replacement Algorithms, File Systems: Unix File System, Log- Structured File System, Andrew File System (AFS), Cryptographic File Systems, Server Less Network File Systems, Coda File System, File System Mounting and Sharing, File System Implementation and Allocation Methods- Device Management: Disk Structure, Scheduling and Management, I/O Hardware and Kernel I/O Subsystem, Virtual Memory

UNIT III

Introduction, Access Control Fundamentals, Multics, Security in Ordinary Operating Systems, Verifiable Security Goals, Security Kernels, Securing Commercial Operating Systems, Solaris Trusted Extensions, Building a Secure Operating System for Linux, Secure Capability Systems, Secure Virtual Machine Systems, System Assurance.

UNIT IV

Secure Operating Systems- Security Goals- Trust Model- Threat model- Access Control Fundamentals: Lampson's Access Matrix, Mandatory Protection Systems, Reference Monitor- Secure operating system definition- Assessment Criteria
UNIT V
Security in Windows and Unix: Protection System, Authorization, security Analysis and Vulnerabilities- The security Kernel- Secure Communications Processor – Retrofitting security into Operating Systems, Fault Tolerance Issues, OS Issues related to the Internet, Intranets, Pervasive Computing, Embedded Systems, Mobile Systems and Wireless Networks, Nessus Tool, OpenVAS Tool, Snort Tool, NPM Audit Tool, CalmAV(Anti Virus), Malwarebytes Tool.

Reference Books:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", John Wiley & Sons ,Inc., 9th Edition, 2012.
2. William Stallings, "Operating System: Internals and Design Principles", Prentice Hall, 7th Edition,2012.
3. Tom Adelstein and Bill Lubanovic, "Linux System Administration", O'Reilly Media, Inc., 1st Edition, 2007.
4. Trent Jaeger, "Operating Systems Security", Morgan & Claypool Publishers, 2008.
5. Michael J.Palmer, "Guide to Operating Systems Security", Thomson/Course Technology, 2004.

6. Mukesh Singhal and Niranjan Shivaratri, Advanced Concepts in Operating Systems, McGraw-Hill, 2011.
7. Trent Jaeger, Operating System Security, Morgan & Claypool Publishers, 2008.

2MICS4–CYBER CRIME & LAW

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Introduction-Cyber Security, Issues and Challenges of Cyber Security, Architecture of Cyberspace, Intervention Strategies: Redundancy, Diversity and Autarchy, Cyberspace:Definition, Overview of Communication and Web Technology, Internet, World Wide Web , Advent of Internet, Nature of Internet, Internet Infrastructure for Data Transfer, Internet and Society, Need of cyber law, Regulation of Cyberspace, Key Regulatory issues in India, Regulation via Software, Regulation via Hardware, Application of Common Law Principles for Internet Regulation, Private Regulation, Human Rights in Cyberspace, Freedom of Expression, Privacy, Anonymity, Harassment and defamation, Economic Rights, IPR, Jurisdiction, Protecting Human Dignity in the Digital Age, Commercialization of the Internet.

UNIT- II

Legal Perspectives of Cybercrimes and Cyber security,Originand state of cyber crime, Cybercrime and the Legal Landscape around the World, Need Cyber laws, The Indian IT Act and its Amendments, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of IT Act, Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Cybercrime and Punishment, Data Privacy, Data Security,Big Data Security: issues and challenges, General Data Protection Regulations (GDPR), Personal Data Protection Bill and its Compliance,Data Protection Principles, Data Protection Officer, Incident Management and Business Continuity, Contract Act, Trademark Act, Copyright, Patents

UNIT- III

Cybercrime Targeting Computer Systems – Data Diddling, Attacks, Spy Ware, Logic Bombs, Email Scam and Phishing, Theft, Obscene Content, Cyber bullying, Cyber grooming, Online job fraud, Online sextortion, Vishing, Sexting, Smshing, Sim Swap scam, Debit/Credit card fraud, Impersonation and identity theft, Data breach, Denial of services /distributed dos, Website defacement, Cyber-squatting, Pharming, Cryptojacking(crypto Currency), Online Drug Trafficking, Espionage Act, Cyber Law in perspective Advanced Technology: IOT, AI, Machine Learning, BlockChain and Law for DarkNet, Social Media & Social Defamation

UNIT- IV

Cybercrime Against Persons- Child Pornography/ Child Sexually Abusive Material (CSAM), Cyber Stalking and Its Type, Phishing and Its Type, Ethics And Its Important, Legal Developments, Cyber Security In Society, Online Cyber Crime Reporting,

UNIT- V

Cybercrime Targeting Countries – Cyber Terrorism, International Response to Cybercrime, Digital Evidence and Computer Forensics, Regulation and Jurisdiction for global Cyber security, Copy Right-Source of Risks, Pirates, Internet Infringement, Fair Use, Postings, Criminal Liability, Malware Analysis: -Spamming, SMSware, Malware, Adware, Ransomware, Virus, Worms &Trojans

Reference Books:

1. Kumar K -Cyber Laws: Intellectual Property & E Commerce, Security, Dominant Publisher
2. Information Security Policy & Implementation Issues, NIIT, PHI
3. Marine R.C.- Cyber Crime Impact in the New Millennium, Auther Press

4. Sunit Belapure and Nina Godbole, Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives, Wiley India Pvt. Ltd, 2011.

5. Mark F Grady, Fransesco Parisi, "The Law and Economics of Cyber Security", Cambridge University Press, 2006

6. Jonathan Rosenoer, "Cyber Law: The law of the Internet", Springer-Verlag, 1997.

2MICS5(A) - GOOGLE DORKS & PENETRATION TESTING

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Penetration Testing: Introduction, Significance of Penetration Testing, Testing Process, Penetration Testing Scope, Tools for Penetration Testing Various Applications, Pre-engagement, Rules of Engagement, Goal, Scope of Engagement, Timetable, Liabilities and Responsibilities, Non-disclosure Agreements, Emergency Plan, Allowed Techniques, Deliverables, Methodologies-PTES and OWASP Testing, Phases of PTES, Pre-engagement Interactions Phase, Intelligence Gathering Phase, Threat Modeling Phase, Vulnerability Analysis Phase, Validation, Exploitation Phase, Post Exploitation Phase, Reporting- Clients Needs/Wants, Writing Report, Reporting Phase, Report Structure-Executive Summary, Risk Exposure over time, Successful attacks by type, Vulnerabilities by cause, Vulnerability Report, Remediation Report, Information Gathering, Active and Passive Sniffing

UNIT-II

Web App Security: Introduction to Burp Suite and OWASP ZAP, Kali Linux, Cross-Site Scripting (CSS), Web Authentication and Session Management, Mobile Device Security Issue, OSINT Framework
Information Gathering: Finding owner, IP, and Emails, WHOIS- Command Line, Web-based Tool, DNS, NSLOOKUP- Find target ISP, NETCRAFT, Infrastructure- Fingerprinting the web server, NETCAT, WAPPALYZER, Web Server Modules, Enumerating subdomains, NETCRAFT, GOOGLE, SUBBRUTE, DNSRECON, THEHARVESTER, Zone transfer , Finding Virtual Hosts, Fingerprinting Frameworks and Applications, Fingerprinting Custom Applications- Burp Target Crawler , Creating a Functional Graph, Mapping the attack surface-Client side validation, Database interaction, Display of user-supplied data, Redirections, Error messages, Charting, Enumerating resources, Crawling the website, Finding hidden files, Back up and source code, Enumerating users accounts, Map, Directory listing, Log and configuration files, Shodan HQ, Access control and login-protected pages

UNIT-III

Google Searching Basics: Exploring Google's Web-based Interface, Google's Web Search Page, Google Web Results Page,Google Groups, Google Image Search, Google Preferences, Language Tools Building Google Queries, Rules of Google Searching, Basic Searching Using Boolean Operators and Special Characters, Search Reduction, Working With Google URLs, URL Syntax, Advanced Operators Syntax, Google's Advanced search Operators, keyword: Intitle, Allintitle, Allintext, Inurl and Allinurl, Site, Filetype, Link, Inanchor, Cache, Numrange, Daterange, Info, Related, Author, Group, Titles, Insubject, Msgid, Stocks

UNIT-IV

Google Hacking: Anonymity with Caches, Directory Listings, Locating Directory Listings, Finding Specific Directories, Finding Specific Files, Server Versioning, Directory Traversal, Incremental Substitution, Extension Walking.

UNIT-V

Sensitive Information Search : Searching for Usernames, Searching for Passwords, Searching for Credit Card Numbers, Social Security Numbers, and Personal Financial Data, Geek Stuff, Utilities, Open Network Devices, Open Applications, Cameras, Sensitive Info, Social Security Numbers, Credit Card Information

Protection from Google Hackers: Web Server Safeguards, Directory Listings and Missing Index Files, Robots.txt: Preventing Caching, NOARCHIVE, NOSNIPPET, Gooscan

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References Books:

1. Michael T. Simpson, Kent Backman, James Corley-Ethical Hacking and Network Defence.
2. Stuart McClure Joel Scambray, George Kurtz -Hacking Exposed—Network Security Secrets & Solutions,
3. Johnny Long , Google Hacking For penetration Testers, Volume 2 by PUBLISHED BY Syngress Publishing, Inc. (Elsevier, Inc)
4. Baloch, R., Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.
5. Beaver, K., Hacking for Dummies, 3rded. John Wiley & sons., 2013.
6. Council, Ec. , Computer Forensics: Investigating Network Intrusions and Cybercrime, Cengage Learning, Second Edition, 2010
7. McClure S., Scambray J., and Kurtz G, Hacking Exposed. Tata McGraw-Hill Education, 6the Edition, 2009
8. Davidoff, S. and Ham, J., Network Forensics Tracking Hackers through Cyberspace, Prentice Hall, 2012.
9. Michael G. Solomon, K Rudolph, Ed Tittel, Broom N., and Barrett, D.,Computer, Forensics Jump Start, Willey Publishing, Inc, 2011.
10. Kimberly Graves, "CEH: Official Certified Ethical Hacker Review Guide", Wiley Publishing Inc., 2007. ISBN: 978-0-7821-4437-6.
11. Shakeel Ali &TediHeriyanto, "Backtrack -4: Assuring security by penetration testing", PACKT Publishing., 2011. ISBN: 978-1-849513-94-4.

2MICS5(B)- WEB DEVELOPMENT

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
			Credits/Hours				
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Introduction to HTTP, HTML, Basic HTML Tags, Body Tags, Coding Style, Modifying & formatting Text, Lists – Unordered, Ordered, Definition, Insert Links -Linking to another Document, Internal Links, Email Links, Relative and Absolute Links, Insert Images - Referencing Images, Clickable Images, Image Placement and Alignment, Image Size, Image Margins, Image Formats, Image Maps- Defining an Image Map, Advanced Coloring Body Content, Working with tables - Basic Tables, Table Attributes, Table Cell Attributes, Table Row Attributes, Tables Inside of Tables, Invisible Spacers, Working with Frame-Based Pages- Creating Windows, Single Window Frames, Creating Column Frames, Creating Row Frames, Creating Complex Frames.

UNIT-II

Cascading Style Sheet (CSS) – Introduction, creating style, using inline and external CSS, Creating Divs with ID style, Creating Tag& Class style, creating borders, Navigation links, creating effects with CSS. JavaScript – Introduction, use of JavaScript in web pages. Understand JavaScript event model, use some basic event and control webpage behavior.

UNIT-III

Introduction to PHP, History of PHP, Versions of PHP, Features of PHP, Advantages of PHP over Other Scripting Languages, software requirements, Installation and Configuration of PHP, Installing and Configuring Apache to use PHP on Windows, Basic HTML, Embedding PHP in HTML, PHP Basic syntax, data types, comments, variables and constants, scope of variables, PHP arrays: creating array and accessing array elements, PHP String, PHP operators, precedence of operators, expressions, creating a PHP Script, running a PHP script. PHP conditional statements, switch case, PHP looping statements, while, for and do while loop, break, continue, exit, PHP functions: built-in and user defined function, declaration and calling of a function, function argument with call by value, call by reference, string manipulation, mathematical, date and time functions.

UNIT-IV

Introduction to a web form, processing a web form, capturing form data, passing information between pages, PHP $_GET, PHP $_POST, with multi value fields, validating a web form, input validation, exception and error handling, introduction to cookies and session handling. Working with database: PHP supported databases, using PHP & My SQL: Installation and configuration of My SQL on windows, checking configuration, connecting to database, selecting a database, adding table and altering table in a database, inserting, deleting and modifying data in a table, retrieving data, performing queries, processing result sets.

UNIT-V

Code re-use, require(), include(), and the include_path, PHP file permissions, working with files: opening, closing, reading, writing a file, file system functions and file input and output, working with directory: creating, deleting, changing a directory, file uploads, introduction to object oriented programming with PHP.

Reference Books:

1. Roger S. Pressman, David Lowe, "Web Engineering", Tata McGraw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P, Akilandeswari "Web Technology: a Developer S Perspective", PHI
4. Ivan Bay Ross, "HTML,DHTML,JavaScript,Perl CGI", BPB.
5. Web Technologies, Black Book, Dreamtech Press
6. HTML 5, Black Book, Dreamtech Press
7. Joel Sklar -Web Design,, Cengage Learning
8. Harwani-Developing Web Applications in PHP and Ajax, Mcgrawhill
9. Learn HTML IN A Weekend By Steven E. Callihan, PHI
10. Teach Yourself JavascriptIn 24 Hrs. by Michael Moncur, Techmedia
11. HTML and CSS, Jon Duckett, John Wiely, 2012
12. Steven Holzner, The Complete Reference PHP, TMH
13. Steve Suehring, Tim Converse and Joyce Park, Wiley-India Pvt Ltd
14. Matt Doyle, Beginning PHP, Wiley-India Pvt Ltd
15. Joel Murach and Ray Harris, Murach's PHP & MY SQL, SPD Pvt Ltd

2MICS6- LAB-II

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
	Credits/Hours						
0/0	0/0	5/10	5/10	0	20	80	100

List of Practical of Information & Network Security:

1. Hide and Unhide the Picture using Steganography
2. Perform the encryption and Description of Text and WAV file
3. Perform the Symmetric Key and File Exchange, Symmetric Decryption
4. Perform encryption and decryption using the following algorithms:
   a) Ceaser Cipher   c) Hill Cipher
   b) Substitution Cipher   d) Breaking the Shift Ciphe
5. Implement RSA Algorithm
6. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Consider the end user as one of the parties (Alice) and the JavaScript application as other party (bob).
7. Implement Message Authentication Codes
8. Implement the Cryptographic Hash Functions and Apply them
9. Implement Symmetric Key Encryption Standards (DES) and Asymmetric Key Encryption Standards (AES)
10. Implement Digital Signatures and Water Marking
11. Implementation/ Simulation of DOS/ DDOS attacks.
12. Preparations of SSL certificates
13. Implementation of SELINUX

List of Practical Using Operating System Concept:

14. Write Program For Implementation Of System Calls.
15. Write Program For File Permissions
16. Write Program For File Operations
17. Write Program For File Copy and Move
18. Write Program For Dining Philosophers Problem
19. Write Program For Producer – Consumer Problem concept
20. Write Program For First In First Serve Algorithm.
21. Write Program For Shortest Job First Scheduling Algorithm.
22. Write Program For Round Robin Scheduling Method.
23. Write Program For Priority Scheduling Algorithm
24. Write a program for scanning port
25. Implement the Trust and confidentiality
26. Perform Auditing, Accounting, and Logging activity in OS
27. Write Policy for port scans run, password requirements, virus detectors, etc
28. Perform the Vulnerability Assessment using below mentioned concepts:
    - Port scanning,
    - Bad passwords,
    - Suid programs,
    - Unauthorized programs in system directories,
    - Incorrect permission bits set,
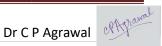   - Program checksums / digital signatures

- System scripts or configuration files.
- New unauthorized accounts.

29. Implement the following concepts in Windows/Linux Operating System
   - Authentication(Username / Password, User card/key, User attribute - fingerprint/ eye retina pattern/ signature/Image/EEG)
   - One Time passwords(Random numbers /Secret key/Network password)

30. Protect the Operating System from the virus (Anti Virus)
31. Configure the firewall to protect the system

List of Practical of Google Dorks:

32. Use following Google operators to find valuable information for any target website.
   - inurl
   - site
   - filetype
   - intitle
   - intext
   - cache
   - info
   - link
   - related
   - indexof

33. Choose an organization and use Google to gather as much information as possible about it.

34. Use the Google filetype search operator and look for interesting documents from the target organisation.

35. Re--do the exercise on your company's domain. Can you find any data leakage you were not aware of?

36. Use Google Operators for carrying out below mentioned tasks:
   - Retrieve Log files
   - Identify Vulnerable/Hacked web servers
   - Retrieve important information Open FTP servers
   - Get ENV files(Configuration information) of web site
   - Retrieve SSH private keys
   - Retrieve Email lists
   - Access Live Private cameras
   - Retrieve MP3, Movie, and PDF files of Website
   - Retrieve Weather Information
   - Retrieve Pages Containing Login Portals
   - Retrieve Sensitive Directories of Website
   - Advisories and Vulnerabilities
   - Retrieve Files Containing Usernames
   - Retrieve Files Containing Passwords
   - View and Access Various Online Devices

List of Practical of Web Development:

37. Write an HTML code to display your education details in a tabular format.
38. Write an HTML code to display your CV on a web page.
39. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
40. Write an HTML code to create a login form. On submitting the form, the user should get navigated to a profile page.
41. Write an HTML code to create a Registration Form. On submitting the form, the user should be asked to login with this new credentials.
42. Write an HTML code to create your Institute website, Department Website and
43. Tutorial website for specific subject.
44. Write an HTML code to illustrate the usage of the following:
    - Ordered List
    - Unordered List
    - Definition List
45. Write an HTML code to create a frameset having header, navigation andcontent sections.
46. Write an HTML code to demonstrate the usage of inline CSS.
47. Write an HTML code to demonstrate the usage of internal CSS.
48. Write an HTML code to demonstrate the usage of external CSS.
49. Write a Java script to prompt for users name and display it on the screen.
50. Design HTML form for keeping student record and validate it using Java script.
51. Write an HTML program to design an entry form of student details and send it to store at database server like SQL, Oracle or MS Access.
52. Write programs using Java script for Web Page to display browsers information.
53. Create an applet which will have a line, an Oval & a Rectangle
54. Writing program in XML and create a style sheet in CSS & display the document in internet explorer.
55. Write an XML program to display products
56. Write a program using PHP and HTML to create a form and display the details entered by the user
57. Create a PHP page using functions for comparing three integers and print the largest number.
58. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
59. Write a PHP script that finds out the sum of first n odd numbers.
60. WAP to check whether the given number is prime or not.
61. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
62. Write a PHP function that checks if a string is all lower case.
63. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
64. WAP to create and sort an array.
65. WAP to create an associative array.
66. Write a PHP script to read a file character by character
67. Write a PHP script to append text to a file

SEMESTER -III

3MICS1-DIGITAL MARKETING & SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours						
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Digital Marketing Overview- Digital Marketing , Traditional Marketing vs. Digital Marketing, Understanding Traffic, Categorization of Digital Marketing for The Business, Legal and Ethical Issues, Search Engine Optimization (SEO)- On Page Optimization, Off Page Optimization. Goals: Learn How To Use Dozens of Proven Digital Marketing Strategies.

UNIT-II

Social Media Overview- Social Media Features, Social Media Tools and Platforms, Social Media Monitoring, Hashtag, Viral Content. **Social Media Marketing -** SMM Vs. SMO Benefits of using SMM Social Media Strategy, Email Marketing Goals: Basic of Social Media, Develop the Product Concept for Marketing Purposes.

UNIT-III

Social Media Marketing - Facebook Marketing-Profiles and Pages, Business Categories, Facebook Page Custom URL, Invite Page Likes, Scheduling Posts, Facebook Events, Facebook Insights Reports, Competitor's Facebook Page, Connect With Twitter. Facebook Ad Campaigns- Ad Objective, Performance Matrix, Ad Components, Facebook Ad Structure, Facebook Insights, Facebook Page Promotion, Video Promotion. Goals: Develop Facebook Campaign for the Product Concept.
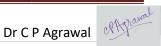
UNIT-IV

Google Ads- Introduction to Ad words, Keyword Planner, PPC, PPC Terminology, PPC AD on Google Facebook. Goals: Use social media to keep abreast of the latest trends in your industry.

UNIT-V

Content Marketing and Security, Security for SMM, Social Media Privacy, Secure Payments and Website Encryption, Cookies, VPN, Digital Certificate, E-Governance, E-Wallet, .Goals: Understand Security Issues Related to Social Media and Digital Marketing

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Reference Books:

1. Ryan Deiss, Russ Henneberry (2017) Digital Marketing for Dummies, John Wiley & Sons.
2. AhujaVandana (2015) Digital Marketing, Oxford University Press.
3. Ira Kaufman, Chris Horton (2014) Digital Marketing: Integrating Strategy and Tactics with Values, A Guidebook for Executives, Managers, and Students, Routledge,
4. Matt Chiera (2018) Digital Marketers Sound Off: Tips, Tactics, Tools, and Predictions from 101 Digital Marketing Specialists, Matt Chiera,
5. Puneet Bhatia (2017) Fundamentals of Digital Marketing, Pearson India, ISBN 9352861418, 9789352861415

3MICS2 - ETHICAL HACKING

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Ethical Hacking Overview, Hacking Life Cycle, Legal Issues in Ethical Hacking, Hacking Terminology, Gathering Facts, CP/IP Concepts Review, Network and Computer Attacks,

UNIT-II

Network Enumeration and Foot Printing- DNS Query, WHOIS Query, OS Finger Printing, Banner Grabbing, CERT-In Guidelines :CERT-In Guideline for Securing Wireless Access Points/Routers, Credit Card, Email, Web Server Security, Auditing and Logging, Securing Home Computers, SQL Server Security, Linux and Windows Server security, IDS - Intrusion Detection System, Anti Virus Policy

UNIT-III

Programming For Security Professionals- Web Application Vulnerabilities, Buffer Overflow Attack, Session Hijacking, Code Injection Attacks-Cross Site Scripting (CSS) Attack, SQL injection Attack. Required Lab goals: Basics of Ethical Hacking, Gathering Information Required in Order to Attack Target, Finding Critical Bugs in Servers.

UNIT-IV

Password Hacking, Windows Hacking, Logging by Pass, Network Hacking, and Anonymity and Email Hacking. Web Servers Hacking, Session Hijacking, Surveillance, Desktop, Server and OS Vulnerabilities, Required Lab. Goals: Methods of Password Encryption and Decryption learn to remain anonymous over the Internet.

UNIT-V

Database Attacks, Hacking Wireless Networks, Cryptography, Network Protection Systems, Trojan and Backdoor Applications, Legal Resources, Virtualization and Ethical Hacking. Required LabGoals: ways to maintain access to a system using Trojan and backdoor, attacking database server and wireless networks.

References Books:

1. Michael T. Simpson, Kent Backman, James Corley-Ethical Hacking and Network Defence.
2. Stuart McClure Joel Scambray, George Kurtz -Hacking Exposed—Network Security Secrets & Solutions,

3MICS3- APPLICATIONS & SYSTEMS SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Protection & Security: Goals of Protection, Domain of Protection, Security Problem, Authentication, One Time Password, Program Threats, System Threats, Threat Monitoring, Encryption.

UNIT-II

Software and System Security: Control Hijacking Attacks – Buffer Overflow, Integer Overflow, Bypassing Browser Memory Protection, Sandboxing and Isolation, Tools and Techniques for Writing Robust Application Software, Security Vulnerability Detection Tools, and Techniques – Program Analysis, Privilege, Access Control, and Operating System Security, Exploitation Techniques, and Fuzzing, Operating System Mechanisms, Unix, Windows, Qmail, Chromium, and Android

UNIT-III

Security in Mobile Platforms: Android Security Model, Threat Models, Information Tracking, Rootkits, Threats in Mobile Applications, Analyzer for Mobile Apps to Discover Security Vulnerabilities, Viruses, Spywares, Keyloggers and Malware Detection

UNIT-IV

Hardware Security, Supply Chain Security: Threats of Hardware Trojans and Supply Chain Security, Side Channel Analysis based Threats, and attacks.

UNIT-V

Infrastructure Security:IT Infrastructure Management Services, Service Strategy, Service Design, Service Transition, Service Operation, Continual Service Improvement
Data Centre Management: Introduction to DCM, Data Center design, Data Center Security Procedure, Server Security, Storage area network, Virtualization, Introduction of Virtual Private Cloud (VPC), Cloud Logging and monitoring.

References Books:

1. Principles of Computer Security: W.A.Coklin, G.White, Fourth Edition, McGrawHill
2. Cryptography and Network Security Principles and Practices,William Stallings,Seventh Edition,Pearson
3. Web Technologies: TCP/IP, Web/Java Programming, and Cloud Computing Achyut S. Godbole,Tata McGraw-Hill Education, 2013
4. Principles of Computer Security: W.A.Coklin, G.White, Fourth Edition, McGrawHill

3MICS4- SERVER ADMINISTRATION & SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
colspan	Credits/Hours						
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus:

UNIT- I

Role of System Administrator, Common Administrative Tasks, Install the server - Select & Install the Linux Server. Setup Requirements, Selecting various Options, Using Linux - using Shells, I /O Redirection, Copy, move, create, delete, and organize files using wildcards, Run commands more efficiently by using advanced features of the bash shell, shell scripts, Configure Local Services - Hardware and System Clock, Common Linux Printing System, Defining a Printer, Device Management - Installing and managing new devices in your system, Manage users and groups - User and Group Concepts, User Administration - create, modify, and delete users, administrating password policies, Group administration

UNIT- II

Managing Files - Filesystem Hierarchy Standard, Navigating the Filesystem, Displaying Directory Contents, Determining Disk Usage With baobab, File Ownership, File and Directory Permissions, Changing File Permissions, Directory Manipulation, File Manipulation, Deleting and Creating Files.
Controlling Access to Files - File Ownership, Default Group Ownership, File and Directory Permissions, File Creation Permissions with UMASK, Changing File Permissions, SUID and SGID on files, SGID and Sticky Bit on Directories, User Private Group Scheme, File Access Control Lists, Manipulating FACLs, Viewing FACLs, Backing Up FACLs,
Monitor System Resources– Processes in Linux, Viewing Processes, Managing Processes, Tuning Process Scheduling, System Status - CPU, System Status - I/O, System Status - Memory, Filesystem Structures, Determining Disk Usage With df and du, Configuring Disk Quotas, Setting Quotas, Viewing and Monitoring Quotas,
Control services and daemons - init, Linux Runlevels Aliases, systemd System and Service Manager, systemd Targets, Using systemd, Legacy Support for SysVinit,
Configure and secure OpenSSH service - Secure Shell, OpenSSH Client & Server Configuration, Accessing Remote Shells, Transferring Files, Alternative sftp Clients, SSH Key Management, ssh-agent
Analyzing and Storing Logs - System Logging, systemd Journal, systemd Journal's journalctl, Secure Logging with Journal's Log Sealing, Cockpit - Logs, Syslog-ng, Rsyslog, /etc/rsyslog.conf, Log Management, Log Anomaly Detector, Hardware and System Clock, Time Synchronization with Chronyd

UNIT-III

Manage Linux networking - IPv4 Fundamentals, TCP/UDP Fundamentals, IPv6, Linux Network Interfaces, Ethernet Hardware Tools, Network Configuration with ip Command, Starting and Stopping Interfaces, Configuring Routing Tables, IP to MAC Address Mapping with ARP, DNS Clients, DHCP Clients, Continual Time Sync with NTP, Network Diagnostics, NetworkManager,
Archive and copy files between systems - Archives with tar, Archives with cpio, The gzip Compression Utility, The bzip2 Compression Utility, The XZ Compression Utility, The PKZIP Archiving/Compression format

Install and manage software packages - Managing Software, RPM Features, RPM Architecture, RPM Package Files, Working With RPMs, Querying and Verifying with RPM, Managing Software Dependencies, Using the Yum command, Yum package groups, Updating the Kernel RPM, Dealing With RPM & Yum Digest Changes, Yum Repositories, Yum Repository Groups, Yum Plugins & RHN Subscription Manager, Yum Version Lock Plugin,

UNIT-IV

Disk Storage Management - Naming the Devices, Linux File Structure, Filesystem Links, Partitioning Disks with fdisk, Partitioning Disks with parted, Primary, Extended, and Logical Partitions, udev and df, Filesystem Creation, Mounting Filesystems, Filesystem Maintenance, Persistent Block Devices, Swap, Filesystem Attributes, Filesystem Table (/etc/fstab)

Analyze servers and get support - Investigate and resolve issues in the web-based management interface, getting support to help solve problems.

Schedule future Linux tasks - Automating Tasks, at/batch, cron, The crontab Command, crontab Format, /etc/cron.*/ Directories, Anacron, Systemd Timers,

Tune system performance - Improve system performance by setting tuning parameters and adjusting scheduling priority of processes.

UNIT-V

Control the Boot Process and Services - System Boot Method Overview, systemd System and Service Manager, Modifyingsystemd services, Systemd Service Sandboxing Features, systemd Targets, Using systemd, Legacy Support for SysVinit, Booting Linux on PCs, GRUB Configuration, /sbin/init, System Init Styles, Linux Runlevels, /etc/inittab, Managing Daemons, Legacy local bootup script support, System Configuration Files Controlling Service Startup, Shutdown and Reboot.

Control access to files with access control lists (ACL) - File and Directory Permissions, File Access Control Lists, Manipulating FACLs, Viewing FACLs, Backing Up FACLs

Manage SELinux security - SELinux Security Framework, SELinux Modes, SELinux Commands, Choosing an SELinux Policy, SELinux Booleans, Permissive Domains, SELinux Policy Tools, SELinux Troubleshooting,

Secure Network Services - SSH Port Forwarding, Persistent Port Forwarding Configuration, Basic Firewall Activation, Netfilter: Stateful Packet Filter Firewall, Netfilter Concepts, Using the iptables Command, Netfilter Rule Syntax, Targets, Common match_specs, Connection Tracking.

Reference Books:

1. Linux Administration A Beginners Guide byWale Soyinka, 6/E Paperback, MCGraw Hill, ISBN-9780071767583
2. Linux System Administration LPI LSYA-SSMN-9111A. Revision 1.0. ©1988-2000 Wave Technologies International, Inc available online at http://index-of.es/OS/LPI%20-%20Linux%20System%20Administration.pdf
3. Linux: System Administration and Practical Management Guidelines, by Nathan Clark, Paperback
4. https://www.linuxtopia.org/online_books/linux_administration_index.html
5. http://linux-training.be/linuxsys.pdf
6. http://www.nongnu.org/lpi-manuals/manual/pdf/GNU-FDL-OO-LPI-201-0.1.pdf

3MICS5(A)- IT ASSET SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Network Security: Internet Architecture, Network Protocols and Vulnerability, Application-Layer Security, Public Key Infrastructure, DNS Security Extensions, Hyper Text Transfer Protocol Secure (HTTPS), Network Time Protocol (NTP) Security, Transport-Layer Security, Handshake, Key-Derivation, Data-Transfer security, Network Layer Security, IP Masquerading, , IPv6 Security, Link Layer Security, Port-based Authentication, Extensible Authentication Protocol (EAP), Attack On Ethernet Switch, Wireless LAN Security , Network Defence Tools , Packet Filters/ Application Gateway (AG), Circuit-level Gateway (CG), Intrusion Detection Systems (IDS), An Intrusion Prevention System (IPS) , Cloud security &Virtualization , Internet of Things (IoT) Security,

UNIT-II

Physical Layer Security and Telecommunications: Physical Layer Schemes for Confidentiality, Integrity and Access Control, Key Establishment based on Channel Reciprocity, MIMO-supported Approaches: Orthogonal Blinding, Zero-Forcing, Secrecy Capacity, Friendly Jamming, Using Physical Layer to Protect Data Integrity, Low Probability of Intercept and Covert Communication, Jamming and Jamming-Resilient Communication, Physical-Layer Identification, Device under Identification, Identification Signals, Device Fingerprints, Attacks on Physical Layer Identification

UNIT-III

Cyber Systems Security: Cyber-Physical Systems and their Security Risks, Characteristics of CPS, Protections Against Natural Events and Accidents, Security and Privacy Concerns, Attacks Against CPSs, High-Probe, Real-World Attacks Against CPSs, Crosscutting Security, Preventing Attacks, Detecting Attacks, Mitigating Attacks, CPS Domains

UNIT-IV

Hardware Security: Hardware design cycle and its link to hardware security, Short background on the hardware design process, Root of trust, Threat model, Root of trust, threat model and hardware design abstraction layers, Measuring hardware security, Common criteria and EMVCo, SESIP: Security Evaluation Standard for IoT Platforms, Secure Platforms, HSM Hardware Security Module, Secure Element and Smartcard, Trusted Platform Module (TPM), Hardware support for software security at architecture level

UNIT-V

BIOS Security: Introduction to BIOS concepts, UFFI/EFI Boot Process, Chipset architecture, Input/output (including PCI) and how the BIOS uses it to configure the system, PCI Option ROMs, BIOS' interaction with the TPM, Measured Boot Process, BIOS' Lockdown of the serial flash, System Management Mode (SMM), CPU Caching.

Reference Books:

1. Debdeep Mukhopadhyay and Rajat Subhra Chakraborty, "Hardware Security: Design, Threats, and Safeguards", CRC Press
2. Silbersehatz A. and Peterson J. L., "Operating System Concepts", Wiley
3. W.A.Coklin, G.White,Principles of Computer Security, Fourth Edition, McGrawHill
4. Bryan Parno, Jonathan M. McCune, Adrian Perrig, Bootstrapping Trust in Modern Computers, Springer Science & Business Media, 2011.
5. Dave Shackleford, Virtualization Security: Protecting Virtualized Environments, John Wiley & Sons, 2012.
6. BRAGG, Network Security: The Complete Reference, McGraw Hill Professional, 2012.
7. Vincent Zimmer, Michael Rothman, Suresh Marisetty, Beyond BIOS: Developing with the Unified Extensible Firmware Interface, Intel Press, 2010.

3MICS5(B)- SECURE CODING

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Introduction: Security, CIA Triad, Security Concepts- Exploit, Threat, Vulnerability, Risk, Attack. Malware Terminology: Rootkits, Trapdoors, Botnets, Key Loggers, Honeypots. Active and Passive Security Attacks. IP Spoofing, Tear drop, DoS, DDoS,XSS, SQL injection, Smurf, Man in Middle, Format String attack. Types of Security Vulnerabilities- Buffer Overflows, Invalidated Input, Race Conditions, Access-Control Problems, Weaknesses in Authentication, Authorization, or Cryptographic Practices. Access Control Problems.

UNIT-II

Need for Secure Systems: Proactive Security development process, Secure Software Development Cycle (S-SDLC) , Security issues while writing SRS, Design phase security, Development Phase, Test Phase, Maintenance Phase, Writing Secure Code – Best Practices SD3 (Secure by design, default and deployment), Security principles and Secure Product Development Timeline, CERT Coding Guidelines and Standards, Threat modeling process and its benefits

UNIT-III

Secure Coding Techniques: Protection against DoS attacks, Application Failure Attacks, CPU Starvation Attacks, ARP Spoofing and its Countermeasures. Buffer Overrun- Stack Overrun, Heap Overrun, Array Indexing Errors, String Bugs. Security Issues in C Language: Bits & Byts, Addressing, Byte Ordering, Integer Security, Integer Arithmetic, Avoiding Integer Overflow and Underflow, secure coding of conditional, switch, and Loop statements, Stack based buffer overflow, Type Conversion Issues- Memory Management Issues, dynamic memory allocation and security, bypassing no-executable stacks, Code Injection Attacks

UNIT-IV

Database and Web-specific issues: SQL Injection Techniques and Remedies, Race Conditions, Time of Check, Time of Use, Validating Input, Interprocess Communication, Securing Signal Handlers and File Operations. XSS Scripting Attack and its types – Persistent and Non-Persistent Attack XSS Countermeasures and Bypassing the XSS Filters.

UNIT-V

Testing Secure Applications: Security Code Overview, Secure Software Installation. Role of the Security Tester, Building Security Test Plan. Testing HTTP-Based Applications, Testing File-Based Applications, Testing Clients with Rogue Servers.

References Books:

1. Writing Secure Code, Michael Howard and David LeBlanc, Microsoft Press, 2nd Edition, 2004
2. Buffer Overflow Attacks: Detect, Exploit, Prevent by Jason Deckar,Syngress,1st Edition, 2005
3. Threat Modeling, Frank Swiderski and Window Snyder, Microsoft Professional, 1st Edition,
4. Secure Coding in C and C++, 2nd Edition By Robert C. Seacord, Addison-Wesley Professional.

3MICS6- LAB-III

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
		Credits/Hours					
0/0	0/0	5/10	5/10	0	20	80	100

List of Practical Using Digital Marketing:

1. Develop the digital contents for marketing of particular product
2. Perform email marketing for particular product
3. Perform social media marketing for particular product
4. Perform social media marketing for political party
5. Design advertisement for particular organization using Google ad
6. Carry out advertisement companions for particular organization and particular product using Facebook ad structure
7. Perform web analysis of Government and E-Commerce portal
8. Perform security & privacy analysis of Government, E-Commerce and E-wallet and Payment
9. Carry out advertisement companions for particular organization and particular product for Mobile apps

List of Practical Using Ethical Hacking:

10. Perform network scanning to identify live and vulnerable machines in a network.
11. Perform OS banner grabbing, service, and user enumeration.
12. Perform port scanning to identify live vulnerability in machines over network.
13. Perform system hacking, steganography, steganalysis attacks, and cover tracks.
14. Identify and use viruses, computer worms, and malware to exploit systems.
15. Perform packet sniffing
16. Perform Footprinting
17. Perform email hacking
18. Perform password Hacking and dictionary attack.
19. Conduct a variety of web server and web application attacks including directory traversal, parameter tampering, XSS, etc.
20. Perform SQL injection attacks.
21. Perform different types of cryptography attacks.
22. Perform penetration testing of applications
23. Perform vulnerability analysis to identify security loopholes in the target organization's network, communication infrastructure, and end systems
24. Perform Web-Based Hacking: Servers and Applications.
25. Prepare SSL Certificate
26. Implement Hash Function.

List of Practical Using Server Administration & Security:

27. Installation of Linux
28. Configuring Print Queues
29. User and Group Administration
30. User Private Groups
31. Using a file as a disk partition image
32. Partioning a Disk Image file
33. Using losetup and parted
34. Partitioning a real hard disk
35. Working with file attributes.
36. Mounting options.
37. Managing swap space.
38. Filesystem quotas.
39. Working with XFS
40. Working with btrfs
41. Defragmenting a system.
42. Modifying Filesystem parameters using tune2fs.
43. Navigating Directories and Listing Files
44. Manipulating Files and Directories
45. Disk and Filesystem Usage
46. File and Directory Ownership and Permissions
47. File and Directory Ownership and Permissions
48. User Private Groups
49. Using Filesystem ACLs
50. Viewing & monitor Processes
51. Creating and Managing User Cron Jobs
52. Adding System cron Jobs
53. Setting User Quotas
54. Managing Services With Systemd'ssystemctl
55. Creating a systemd unit file
56. using SSH and SCP
57. SSH Key-based User Authentication
58. Using ssh-agent
59. Using the systemd Journal
60. Setting up a Full Debug Logfile
61. Remote Syslog Configuration
62. Network Discovery
63. Basic Client Networking
64. Introduction to Troubleshooting Labs
65. Troubleshooting Practice: Networking
66. Archiving and Compression
67. Using rsync and ssh for Backups
68. Managing Software with RPM
69. Querying the RPM Database
70. Using Yum
71. Creating and Managing Filesystems
72. Mounting & Unmounting a Filesystem,

73. Automating Mount Points creation and using
74. Creating and Managing User Cron Jobs
75. Adding System cron Jobs
76. Boot Process
77. GRUB Command Line
78. Basic GRUB Security
79. Introduction to Troubleshooting Labs
80. Troubleshooting Practice: Boot Process
81. Using Filesystem ACLs
82. Exploring SELinux Modes
83. SELinux File Contexts
84. Securing Services with Netfilter
85. Installing firewalld
86. Examining firewall-cmd
87. Adding services to a zone

SEMESTER -IV

4MICS1-DIGITAL FORENSICS

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT- I

Log Analysis:, Linux and Windows: What are Logs, Where they are Stored, How to Interpret the Logs. [Required LAB]Goals: Understanding Methods of Logging: Rsyslog, Syslogand Interpreting Logs in Order to Identify Problems.

UNIT- II

Introduction to Digital Forensics, Computer Forensics, Mobile Device Forensics, Network Forensics, Forensics Data analysis and Web Forensics. Evidence -Sources of Digital Evidence, Digital Forensics Models:DFRWS Model, Abstract Digital Forensic Model, Integrated Digital Investigation Model, Enhance Digital Investigation Model,Digital Forensics Investigation, Evidence Gathering Techniques. Required LAB

Cyber Crime Investigation through Data Mining Techniques – Introduction, Data Mining, Data Mining for Digital Forensics, Classification of Crime Data, Frame Work for Web Forensics, Ontology – Motivation for Text Mining, Text Characteristics, Information Retrieval, Information Extraction, Text Mining Process, Goals, Required LABGoals: Forensics includes digging up hidden data, and track left by the attacker.

UNIT- III

Inverted Index Live Forensics – Incident on windows, Linux, and apple computers, basic registry analysis, MRUs and history file analysis.network forensics – network analyzer basic, packet capturing, scan ports, upstream tools and TCP dump, Wire shark, Wireless sniffing, Log and SIEM searches Required LABGoals: scanning network for weakness, capturing the data going through the network.

UNIT- IV

Examination and Analysis Techniques- Search Techniques, Manual Browsing. Disk Forensics – File Systems, Encryptions Issues, SSD Challenges, slackspace, partitions Lab: DD and its many options, strings, Scalpel, sleuthkit. File System Forensics – Malware Analysis, Magic Numbers, Digital Steganography, Browser Forensics, and PST and OST files. Social Media Forensic: - Email forensics: Browser tools, SQL Query, Securing Wifi, Securing DVR, Disk Encryption, (GNUPG), Required LAB, Goals: Retrieving The Lost or Corrupt Data, Securely Deleting Data in Order to preventit from Recovery.

UNIT- V

Android Forensics – Introduction, Acquiring Physical Image of an Android Device, Connecting a Device via Data Cable, Imaging the memory card, USB debugging, Preparing the Hero for rooting, Creating ADD image of memory, examination of memory, Analysis with the Cellebrite, using Apps, required LABGoals: Gaining the Root Access in Android Phone, Collecting Information from Android.

Reference books:
1. Eoghan Casey-Handbook of Digital Forensics and Investigation,
2. Windows Registry Forensics: Advanced Digital Forensic Analysis of the windows registry.
3. John Sammons-The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensic
4. Greg Gogolin -Digital Forensics Explained

4MICS2- SERVER HARDENING

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Firewalls, CISCO, CHEKPOINT, Cyber Roam, SoPhos, Pix: Software & Hardware available to enhance the network security, Goals: complete network security,prevent unauthorized access to network with statefuland deep packet inspection for network, application and user identity-based security.

UNIT-II

Centralized authentication, IPA server, and LDAP: create, delete, modify users and specify permission for users from acentralized servers.
Goals: server thatprovides centralized authentication, authorization and account information by storing data about user, groups, hosts and other objects necessary to manage the security aspects of a network of computers.

UNIT-III

CVE (Common Vulnerabilityand Exposure), OWASP: Online platform/database for known vulnerabilities, Gaining knowledgeaboutthe vulnerability, using the existing exploit, modifying the exploits as per needs.
Goals: To know about organization that operates research to identify and catalogvulnerabilities in Software or firmware into a Free "Dictionary" for organizations to improve their security.

UNIT-IV

Advance ACL, PAM: ACL Rules, how ACL rules works, how to apply, and authentication schemes using PAM, working with API. Goals: help us to provide dynamic authentication support for applications and services in a Linux system.

UNIT-V

Data recovery after Ransomware, HDD Crash, Android Data Recovery: Data Recovery using software's
Goals: how to recover data in different scenario i.e. After a ransomwareattack, data wipe etc.

Reference books:

1. Michael Sikorski, Andrew Honig-"Practical Malware Analysis: The HandsOn Guide to Dissecting Malicious Software" publisher Williampollock
2. Donald A. Tevault-Mastering Linux Security and Hardening: Secure your Linux server and protect it from intruders, malware attacks, and other external threats

4MICS3- DISASTER RECOVERY & RISK MANAGEMENT

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	0/0	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Hazards and Disasters: Planning and Policies, Disaster Mitigation Policies and Planning, Mitigation Planning and Policy Strategies: Local, State, and Federal Level, Measuring and Mapping Vulnerability, Social, Economic, and Political Vulnerabilities, Community Resilience, Emergency Management Planning, Communication and Risk Management (Policies and Plans),

UNIT-II

Disaster Response: Planning for Response, Supporting Emergency Response Operations using Geospatial Technologies, Collaboration and Coordination in Emergency Response Planning & Management, Disaster Recovery and Rebuilding, Long-term recovery, Post-Disaster Recovery Planning and Reconstruction, Post-Disaster Housing Planning, Plan Templates and Software Tools, Implementing Crisis Management Framework

UNIT-III

Risk Management: Introduction to Risk Management, The Business Risk Model, Information and Technology Risk Management, Identifying IT Risks and Controls, Risk Information Processes, Assessing and Mitigating Risk at the Process Level, Managing Project Risk.
Risk Assessments and Risk Semantics: Assessing Information Risks and Controls, A Framework for Assessing IT Risks, The Role of IT Audit and Risk Assessments, IT Governance, Non-Technical Security Risks, The Risks Caused by People – Social Engineering & Behavioral Security.

UNIT-IV

Risk Issues in IT and Telecommunication: The Risks of Connectivity, Risks Surrounding IT and Telecommunication Networks, Organizational Network and Application Security, Internet & Host Security, Firewalls & VPNs, IT Fraud in Organizations, Cyber Crime and Terrorism, Digital and Computer Forensics.

UNIT- V

Security Management: Information Security Management, Corporate Security Policy, Ongoing Management of Information Security, Measuring Security, Incident Response.
Incident Analysis: Introduction, Log analysis, Event criticality, General log configuration and maintenance, Live Incident Response, Timelines

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Reference Books:

1. Waugh, William L. Jr. (2000). Living with Hazards, Dealing with Disasters: An Introduction to Emergency Management. Armonk, New York: M.E. Sharpe.
2. Burby, Raymond (1998). Cooperating with Nature: Confronting natural hazards with land-use planning for sustainable communities. Joseph Henry Press.
3. Birkland, Thomas. 2006. Lessons of Disaster: Policy Change after Catastrophic Events. Washington, D.C.: Georgetown University Press.
4. Drabek, Thomas. 2010. The Human Side of Disaster. Taylor and Francis

5. Charles P Pfleeger-Security in Computing -Pearson Publication
6. Whitman &Mattord, Principles of Incident Response and Disaster Recovery, Course Technology, ISBN: 141883663X
7. Manish Agrawal, Alex Campoe and Eric Pierce, "Information Security and IT Risk Management", Wiley.
8. Michael E. Whitman, "Principles of Information Security", Cengage Learning.

4MICS4-PROJECT WORK

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
0/0	3/3	2/4	5/7	0	20	80	100

GUIDELINES FOR MSC (CIS) PROJECT

The Master of Science (ICS) programme is designed with the objective to prepare the students to grasp opportunity in leading organizations as Information Security Analyst, Security Architect, Cryptanalyst, Penetrate Tester, Security Consultant and Expert, IT Security Engineer, Malware Analyst, Ethical Hacker, Chief Information Security Officer CISO), Forensic Analyst, Security Systems Administrator, and Manager of Computer Emergency Response Team etc. The curricula are designed to provide students comprehensive knowledge with curious mix of theory and practical aspects covering the core and specialized areas of Cyber and Information security. For attaining the same objective, the project work in the area of security in incorporated as mandatory part of curricula in last semester of MSC(ICS). In this project work, the students are supposed to inculcate the skills of critical analysis of security problems, and issues and to develop high quality security solutions by applying theoretical and practical knowledge of various courses learnt.

The project work is the prime constitute component of the course. The student should execute the project work with due care and seriousness by indulging essentials of Information & Cyber Security foundation, guidelines and standards, and professional practices to develop and evolve adequate solutions to security problems. The bulleted activities are the pointers to be integrated as constituent part in the project work.

- Security Requirement Analysis, Information Gathering & Planning
- Modeling and Architecting & Development/Implementation of Secure System
- Vulnerability Analysis, PenetrateTesting, Validation & Deployment
- Project Documentation
- Project Presentation & Viva

TYPE OF PROJECT

The majority of the students are expected to work on a real-life problems, challenges and issues of Cyber and Information security preferably in some industry/ Research and Development Laboratories / Financial and Banking sector/Government Institutions / Software Company. Students are encouraged to work in the various areas of computer security, cyber security, Network security, data security, digital forensic etc. However, it is not mandatory for a student to develop a security software solution for the real-life problem, but the security architecture & threat modeling, firewall deployment, malware analysis, intrusion detection and management system, case study of web analysis, log analysis of computer and mobile phone, recovery system, data collection and forensic investigation & reporting in legal cases etc may also be explored, developed & evolved. The student can formulate a project problem with the help of her/his Supervisor and if approved, the student can commence working on it.

4MICS5(A)- PYTHON FOR CYBER SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT-I

Introduction to Python: Installation,Application Area, Interactive Mode and Script Mode Data Types, Mutable and Immutable Variables, Expressions and Statements, Variables and Keywords, Operators and Operands in Python, Expressions and Statements; Raw_Input( ) and Input( ) and Displaying Output.

Functions: Importing Modules, Invoking Built in Functions, Mathematical Functions, Random Functions, Date and Time Functions, Defining Functions, Invoking Functions, Scope and visibility, Passing Parameters, Scope of Variables, Void Functions and Functions Returning Values, RecursionConditional and Looping Construct.

UNIT- II

Strings: String Operators, Comparing Strings Using Relational Operators; String Functions & Methods, Regular Expressions and Pattern Matching

Lists: Concept of Mutable Lists, Creating, Initializing and Accessing the Elements, Traversing, Appending, Updating and Deleting Elements, Composition, Lists as Arguments, List Operations, List Functions and Methods

Dictionaries: Concept of Key-Value Pair, Creating, Initializing and Accessing the Elements in a Dictionary, Traversing, Appending, Updating and Deleting Elements. Dictionary Functions and Methods

Tuples: Immutable Concept, Creating, Initializing and Accessing Elements in a Tuple, Tuple Assignment, Tuple Slices, Tuple Indexing, Tuple Functions

UNIT- III

Object Oriented Programming: Data Hiding, Data Encapsulation, Class and Object, Polymorphism, Inheritance, Advantages of Object Oriented Programming Over Earlier Programming Methodologies

Classes: Defining Classes (Attributes, Methods), Creating Instance Objects, Accessing Attributes and Methods, Using Built in Class Attributes (Diet, Doc, Name, Module, Bases), Constructor (Init(), Del() and Str()) Methods in a Class, Private Attributes (Limited Support), Importance of "Self", Operator Overloading   with Methods, Inheritance: Concept of Base Class and Derived Class: Single, Multilevelandmultiple Inheritance- Overriding Methods, Using Super() in Derived Class to Invoke Init(), Method Overriding

Data File: Need for Non-Bold for Data File, Types of Data File-Text and Binary, Opening and Closing Files- Open(), Close(), Access Modes (Output, Input, Default), File Object, Access_Modes, Reading and Writing a File Read(), Readline(), Readlines(), Write(),

UNIT- IV

Networking: Basics of Networking, Networking and Multithreading Programming – sockets, Threads andprocesses, Chat Application, Internet Data Handling, Client Application Programming, DDOS,

Penetration Testing: Build port scanner, Build SSH botnet, FTP Scanner, Regular Expression, Models

UNIT- V

Forensic Investigation with Python: Analysis of Wireless Access Point in the Registry, Recover Deleted Items in Recyclebin, Parse PDF metadata, Investigating application artifacts with python
Network Traffic Analysis with Python: Introduction of PyGeoIP, Analyse LOIC traffic, Pentagon's Dilemma, Intrusion Detection System using Scapy
Wireless mayhem with python: Introduction of Wireless Security, Setting of Wireless attack environment, Listen wireless secret, Firesheep Detection
 Web recon with python: Introduction of Social Engineering, Mass Social Engineering

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Reference Books:

1. Chris Mc Nab-Network Security Assessment-O'reilly Publication 3rd edition
2. Chey Cobb-Network Security for Dummies
3. Charles P Pfleeger-Security in Computing -Pearson Publication
4. John V. Guttag, Introduction to Computation and Programming using Python. Prentice Hal
5. R. Nageswara Rao, Core Python Programming, Dreamtech Publication
6. TJ O'Connor, Violent Python – A cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineer
7. Georgia Weidman ,Penetration Testing: A Hands-On Introduction to Hacking 1st Edition
8. Jose Manuel Ortega, Mastering Python for Networking and Security ,September 2018, Publisher(s): Packt Publishing.

4MICS5(B)-CLOUD COMPUTING & SECURITY

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
4/4	1/1	-	5/5	80	20	0	100

Unit-wise Syllabus :

UNIT I

Introduction to Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing, Quantum Computing, Optical Computing, Nano-computing, Network Computing.

Cloud Computing Fundamentals:Motivation, Need, Definition, Principles, Characteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem, Requirements for Cloud Services, Cloud Computing Architecture- User/Client Layer, Network Layer, Cloud Management Layer, Hardware Resource Layer, Network Connectivity in Cloud Computing, Public Cloud Access Networking, Private Cloud Access Networking.

UNIT II

Cloud Computing Management:Cloud Applications, Managing the Cloud, Managing the Cloud Infrastructure, Managing the Cloud Application, Migrating Application to Cloud, Cloud Deployment Models: Private Cloud, Outsourced Private Cloud, Community Cloud, On-Premise Community Cloud, Hybrid Cloud. Cloud Service Models:Infrastructure as a Service, Platform as a Service, Software as a Service, Introduction to Open Source Tools for IaaS, PaaS & SaaS.

UNIT III

Technological Drivers for Cloud Computing:SOA and Cloud, SOA and SOC, Benefits of SOA, Multicore Technology:Multicore Processors and VM Scalability, Memory and Storage Technologies, Cloud Storage Requirements, Networking Technologies, Web 2.0:Characteristics, Difference from Web 1.0, Applications, Social Media, Marketing, Education, Web 3.0:Components, Semantic Web, Web Services, Characteristics, Convergence of Cloud and Web 4.0, Connecting Information: Facebook, Agile Software Models: Agile SDLC for Cloud Computing, Features of Cloud SDLC, Agile Software Development Process, Advantages of Agile, Cloud Application Development Platforms:Windows Azure, Google App Engine, Forcecom, IBM Cloud Computing API

UNIT IV

Virtualization: Full Virtualization, Para virtualization, Hardware-Assisted Virtualization, Hypervisor, OS Virtualization, Server Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Application Virtualization, Processor Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Data Virtualization, Application Virtualization, Hypervisors, Types of Hypervisors, Security Issues and Recommendations, From Virtualization to Cloud Computing, VMware, Microsoft Hyper-V, Open Virtualization (Ovirt) overview

UNIT V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue Service, Microsoft

Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM SmartCloud, Security in Cloud Computing, Cloud General Challenges.
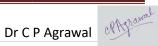

Reference Books :

1. K Chandrasekaran,Essentials of CLOUD COMPUTING, CRC Press [ISBN: 3: 978--4822-0544-2]
2. Raj Kumar Buyya, James Broberg, and RezeiMGoscinski- Cloud Computing: Principles and Paradigms-Wiley.
3. Srinivasan, J.Suresh, -Cloud Computing – A Practical Approach for Learning and Implementation, Pearson India, [ISBN 978131776513]
4. Toby Velte, Anthony Velte, Robert Elsenpeter- Cloud Computing, A Practical Approach - McGraw Hill, ISBN: 0071626948
5. Greg Schulz -Cloud and Virtual Data Storage Networking, Auerbach Publications, ISBN: 978-1439851739.
6. Marty Poniatowski- Foundations of Green IT, ISBN: 978-0137043750.
7. Ravi Kant Soni,Learning Spring Application Development, Packt Publishing.
8. Michael Miller, Cloud Computing.
9. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for Dummies.
10. BorkoFurht, Armando Escalante, Handbook of Cloud Computing, Springer, 2010.

4MICS6- LAB-IV

L	T	P	Load	Theory Paper	InternalEvaluation	PracticalExams	Total Marks
Credits/Hours							
0/0	1/1	4/8	5/9	0	20	80	100

List of Practical using Digital Forensic Tools:

1. Explore and exploit the various computer forensic tools for evidence collection and analysis used in Network Forensic, Database analysis, File analysis, Registry analysis, Email analysis, OS analysis, Disk and data capture.

2. Identify, and collect, prioritize, analyze and reporting on evidence found on computers, laptops and storage media in support of investigations and legal proceedings.

3. Decrypt the Data file collected in evidence of cyber crime

4. Collect email evidence, arranging the evidence, and searching the emails Perform Email Analysis for both web and application based mail clients. Detect and report obscene image attachments in email by using skintone analysis

5. Collect and analyze browser information, including browser history, cookies, proxy settings, web forms, bookmarks, cache, add-ons, saved passwords, etc

6. Extract and creates an output directory for fetching information about credit card, Internet domains, emails, MAC addresses, IP addresses, Images and videos, URL's, telephone numbers, searches performed, etc.

7. Collect digital evidence from mobile phones and cloud services used on phones (Android, Sony, Blackberry and iPhone.)

8. Bypass Android screen lock, get location history, extract data from cloud storages, analyze call and data records, search data keywords, recover deleted data and export data to various file formats

9. Monitor, capture, store and analyze of network activities or events in order to discover the source of security attacks, intrusions or other problem incidents, i.e. worms, virus or malware attacks, abnormal network traffic and security breaches.

10. To recover the electronic evidence from mobile phones, smart phones, SIM cards, PDAs, GPS devices, tablets and game consoles and Analyze evidence of mobile crimes/incidents and report on the basis of evidence in legal cases

11. Extract and analysis the metadata of digital acquired photographic images to validate their authenticity by recovering the metadata of the image file to ascertain its history.

12. Collect and analyze, and evaluate the sound and video recordings for authenticity, originality, tampering, and maliciousness ofthem.

13. Collect and correlate information about the running processes, memory drives, registry, file system metadata, event logs, web history and network activity. Perform memory and host analysis for traces of infection, or any malicious activity.

14. Search the binary image of embedded files in .exe code.

15. Perform memory analysis for MAC OS for finding kernel extensions, gathering kernel information, task listing, Detecting hooks, network listing, dumping a file from memory, presenting boot information and lot of other details.

16. Determine the presence of rootkits on a system for analyzing malware infection and reasons for network compromise

17. Recover the evidence from the RAM of a running computer, also called live acquisition.
18. Create the image of the hard disk for ensuring the integrity of the data using hashing and do the investigation.
19. Perform the windows registry analysis for following:
    ➢ Create a case and load and search the registry using filters, or timestamps.
    ➢ Data collection: Collect target registry files for enumeration and analysis.
    ➢ Recovery: Recover registry for deleted keys.
    ➢ Analysis:
        • Windows analysis: Owner, Installation data, etc.
        • Storage analysis: Accounts present, run commands, browser history analysis (URLs).
        • Network connection analysis: network drive connections, etc.
        • Application analysis: List of auto runs, application usage history, etc.
        • SW and HW management: Software and hardware installations, storage devices connections.
    ➢ Reporting: Create result reports in CSV formats.
20. Write a report of an analysis of digital evidence for a case Using an existing report template
21. Calculate the Hash of Multiple Files and Passwords.
22. Create and modify users on active directory
23. create a back door and hijack system
24. Analyze and Filter, TCP and UDP packets.
25. Apply analysis techniques to open SAM, SYSTEM and SECURITY files
26. Demonstrate the technique for locating a variety of file types Using common digital forensics tools

List of Practical of Server Hardening:
27. Implement the complete network security through unauthorized access and deep inspection of packets for network and applications on the basis of user identity-based security.
28. Store and manage data about user, groups, hosts and other objects necessary for providing the optimal the security computers of network using centralized authentication and authorization
29. Detect, catalog into a Free "Dictionary" , prioritize, mitigate and manage vulnerabilities in Software or firmware of organizations to improving their security.
30. Implement the dynamic authentication support for applications and services in a linux system.
31. Recover data in different scenario i.e. After a ransomware/smsware/adware attack, data wipe etc.
32. Implementation of DVWA kit for Secure coding and testing
33. Mitigation from SQL Injections and other attacks.

List of Practical of Python Programming:
34. Basic Python programs
    ➢ Python program to print "Hello Python"
    ➢ Python program to do arithmetical operations
    ➢ Python program to find the area of a triangle
    ➢ Python program to solve quadratic equation
    ➢ Python program to swap two variables
    ➢ Python program to generate a random number
    ➢ Python program to convert kilometers to miles
    ➢ Python program to convert Celsius to Fahrenheit
    ➢ Python program to display calendar
35. Python programs with conditions and loops
    ➢ Python Program to Check if a Number is Positive, Negative or Zero

- ➤ Python Program to Check if a Number is Odd or Even
- ➤ Python Program to Check Leap Year
- ➤ Python Program to Check Prime Number
- ➤ Python Program to Print all Prime Numbers in an Interval
- ➤ Python Program to Find the Factorial of a Number
- ➤ Python Program to Display the multiplication Table
- ➤ Python Program to Print the Fibonacci sequence
- ➤ Python Program to Check Armstrong Number
- ➤ Python Program to Find Armstrong Number in an Interval
- ➤ Python Program to Find the Sum of Natural Numbers

36. Python Function Programs
- ➤ Python Program to Find LCM
- ➤ Python Program to Find HCF
- ➤ Python Program to Convert Decimal to Binary, Octal and Hexadecimal
- ➤ Python Program To Find ASCII value of a character
- ➤ Python Program to Make a Simple Calculator
- ➤ Python Program to Display Calendar
- ➤ Python Program to Display Fibonacci Sequence Using Recursion
- ➤ Python Program to Find Factorial of Number Using Recursion

37. Python Native Data Type Programs
- ➤ Python Program to Add Two Matrices
- ➤ Python Program to Multiply Two Matrices
- ➤ Python Program to Transpose a Matrix
- ➤ Python Program to Sort Words in Alphabetic Order
- ➤ Python Program to Remove Punctuation From a String

38. Python Array Programs
- ➤ Python program to copy all elements of one array into another array
- ➤ Python program to find the frequency of each element in the array
- ➤ Python program to left rotate the elements of an array
- ➤ Python program to print the duplicate elements of an array
- ➤ Python program to print the elements of an array
- ➤ Python program to print the elements of an array in reverse order
- ➤ Python program to print the elements of an array present on even position
- ➤ Python program to print the elements of an array present on odd position
- ➤ Python program to print the largest element in an array
- ➤ Python program to print the smallest element in an array
- ➤ Python program to print the number of elements present in an array
- ➤ Python program to print the sum of all elements in an array
- ➤ Python program to right rotate the elements of an array
- ➤ Python program to sort the elements of an array in ascending order
- ➤ Python program to sort the elements of an array in descending order

39. Python Number Programs
- ➤ Python program to check if the given number is a Disarium Number
- ➤ Python program to print all disarium numbers between 1 to 100
- ➤ Python program to check if the given number is Happy Number
- ➤ Python program to print all happy numbers between 1 and 100
- ➤ Python program to determine whether the given number is a Harshad Number

- ➢ Python program to print all pronic numbers between 1 and 100
40. Python String Programs:
    - ➢ Python program to check if a string is palindrome or not
    - ➢ Reverse words in a given String in Python
    - ➢ Ways to remove i'th character from string in Python
    - ➢ Python | Check if a Substring is Present in a Given String
    - ➢ Find length of a string in python (4 ways)
    - ➢ Python program to print even length words in a string
    - ➢ Python | Program to accept the strings which contains all vowels
    - ➢ Python | Count the Number of matching characters in a pair of string
    - ➢ Python program to count number of vowels using sets in given string
    - ➢ Remove all duplicates from a given string in Python
    - ➢ Python | Program to check if a string contains any special character
    - ➢ Generating random strings until a given string is generated
    - ➢ Find words which are greater than given length k
    - ➢ Python program for removing i-th character from a string
    - ➢ Python program to split and join a string
    - ➢ Python | Permutation of a given string using inbuilt function
    - ➢ String slicing in Python to rotate a string
    - ➢ Python Counter| Find all duplicate characters in string
41. Python Cyber Security
    - ➢ Write Python Program for performing the Web server fingerprinting
    - ➢ Write Python Program for performing the Simulation of attacks
    - ➢ Write Python Program for performing the Port scanning
    - ➢ Write Python Program for performing the Website cloning
    - ➢ Write Python Program for performing the Load generation and testing of a website
    - ➢ Write Python Program for Creating intrusion detection and prevention systems
    - ➢ Write Python Program for performing the Wireless network scanning
    - ➢ Write Python Program for scanning the Transmission of traffic in the network
    - ➢ Write Python Program for Accessing mail servers
    - ➢ Write Python Program for Creating a TCP ACK Port Scanner
    - ➢ Write Python Program to Create a TCP Replay Tool
    - ➢ Write Python Program to Create a UDP Ping Tool
    - ➢ Write Python Program to Create a Sniffer that filters based on user input
    - ➢ Write Python Program to Create a tool for HTTP Basic Authentication over
    - ➢ Write Python Program to Create a basic Honeypot that logs all activity to a text file

 List of Practical of Cloud Computing:
42. Install Virtual Machine
43. Create Virtual Machine
44. Manage Virtual Machine Images
45. Creating Managing Datacenters and Clusters
46. Adding Physical Hosts (Configure Hypervisors)
47. Managing User Accounts and Roles
48. Managing Red Hat Virtualization Storage
49. Deploying and Managing Virtual Machines
50. Managing Virtual Machine Images
51. Automating Virtual Machine Deployment