



AMITY UNIVERSITY
— R A J A S T H A N —

AMITY INSTITUTE OF INFORMATION TECHNOLOGY (AIIT)

MASTER OF SCIENCE (CYBER SECURITY)(M.Sc.(C.S.))

Programme Code: 121315

Duration – 2 Years Full Time

**Programme Structure
and
Curriculum & Scheme of Examination**

**2021-23
(Choice Based Credit System)**

AMITY UNIVERSITY
R A J A S T H A N

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

| <u>Components</u> | <u>Codes</u> | <u>Weightage (%)</u> |
|---|--------------|----------------------|
| Case Discussion/ Presentation/ Analysis | C | 05 - 10 |
| Home Assignment | H | 05 - 10 |
| Project | P | 05 - 10 |
| Seminar | S | 05 - 10 |
| Viva | V | 05 - 10 |
| Quiz | Q | 05 - 10 |
| Class Test | CT | 10 - 15 |
| Attendance | A | 05 |
| End Semester Examination | EE | 50 |

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

July, 2020

PROGRAMME LEARNING OUTCOMES (PLO)

MASTER OF SCIENCE (Cyber Security)– M.Sc.(C.S.)

- PLO- 1 Demonstrating advanced knowledge in the field of cyber and information security in general and the following particular topics: computer and network security, security management, incident response, computational and digital forensics, biometrics, privacy, and security of critical infrastructure. The candidate possesses special insight and can demonstrate expertise in information security technology, digital forensics, or security management, depending on the chosen program track.
- PLO- 2 Apply advanced knowledge of the current state-of-the-art in the field of cyber and information security.
- PLO- 3 To apply knowledge in new areas within cyber and information security, in particular cloud computer security, security on the Internet of Things (IoT) and Cyber Forensic applications.
- PLO- 4 Utilize knowledge of scientific methodology needed to plan and carry out research in the field of cyber and information security under supervision.

SKILL DEVELOPMENT DETAILS WITH CREDITS OF M.Sc(Cyber Security) PROGRAMME

| Sr. No. | Sem | Skill Development | Credit | Employability | Credit | Entrepreneurship | Credit | Total Nos. | Total Credit |
|---------|--------------|-------------------|-----------|---------------|-----------|------------------|----------|------------|--------------|
| 1 | I | 4 | 8 | 2 | 4 | 1 | 3 | 7 | 15 |
| 2 | II | 3 | 7 | 4 | 8 | 1 | 3 | 8 | 18 |
| 3 | III | 5 | 13 | 2 | 4 | | | 7 | 17 |
| 4 | IV | | | 1 | 25 | | | 1 | 25 |
| | Total | 12 | 28 | 9 | 41 | 2 | 6 | 23 | 75 |

| SKILL DEVELOPMENT SUBJECTS IN M.Sc.(C.S.) PROGRAMME | | |
|--|--------------------|--|
| sem | Course code | Course Name |
| I | MCS102 | Network Security and Cryptography |
| I | MCS122 | Network Security and Cryptography Lab |
| I | MCS135 | Secure Protocol Design |
| I | MCS145 | Secure Protocol Design lab |
| II | MCS201 | Cyber Forensic |
| II | MCS235 | Wireless Networks |
| II | MCS245 | Wireless Networks Lab |
| III | MCS301 | Database and Application Security |
| III | MCS302 | Secure Software Engineering |
| III | MCS333 | Design and Analysis of Algorithms |
| III | MCS335 | Python |
| III | MCS345 | Python Lab |
| IV | | |
| Employability | | |
| sem | Course code | Course Name |
| I | MCS103 | Cyber Security -I |
| I | MCS123 | Cyber Security - I Lab |
| II | MCS202 | Cyber Security - II |
| II | MCS203 | Intrusion Detection Systems |
| II | MCS222 | Cyber Security - II Lab |
| II | MCS223 | Intrusion Detection Systems Lab |
| III | MCS303 | Ethical hacking and Digital Forensic Tools |
| III | MCS323 | Ethical hacking and Digital Forensic Tools Lab |
| IV | MCS460 | Internship |
| Entrepreneurship | | |
| sem | Course code | Course Name |
| I | MCS131 | Information Security Risk Assessment and Assurance |
| II | MCS231 | Cyber Laws & Security Policies |

PROGRAMME STRUCTURE CREDITS SUMMARY
Master of Science (Cyber Security) 2021

| Semester | Credits PG (2 years/ 4 Semesters) | | | | | | | Total |
|--------------|-----------------------------------|-----------|-----------|-----------|----------|-----------|-----------|------------|
| | CC | DE | VA | OE | EVS | NTCC | ANDP | |
| I | 11 | 07 | 04 | 0 | 0 | 01 | 02 | 25 |
| II | 11 | 07 | 04 | 03 | 0 | 06 | 02 | 33 |
| III | 10 | 07 | 04 | 03 | 0 | 10 | 02 | 36 |
| IV | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 25 |
| Total | 32 | 21 | 12 | 06 | 0 | 42 | 06 | 119 |

| | |
|---|------|
| Core Courses | CC |
| Domain Electives | DE |
| Value Added Course | VA |
| Open Electives | OE |
| Environmental Science | EVS |
| Project Work (Non Teaching Credit Course) | NTCC |
| Anandam Project | ANDP |

PROGRAMME STRUCTURE SUBJECTWISE CATEGORY SUMMARY
Master of Science (Cyber Security)-2021

| Semester | Courses/Subjects for PG (2 years/ 4 Semesters)Programme | | | | | | | Total |
|--------------|---|-----------|-----------|-----------|----------|----------|-----------|-----------|
| | CC | DE | VA | OE | EVS | NTCC | ANDP | |
| I | 05 | 09 | 06 | 0 | 0 | 01 | 01 | 22 |
| II | 05 | 07 | 06 | 01 | 0 | 01 | 01 | 21 |
| III | 04 | 07 | 06 | 01 | 0 | 03 | 01 | 22 |
| IV | 0 | 0 | 0 | 0 | 0 | 03 | 0 | 03 |
| Total | 14 | 23 | 18 | 02 | 0 | 8 | 03 | 68 |

| | |
|---|------|
| Core Courses | CC |
| Domain Electives | DE |
| Value Added Course | VA |
| Open Electives | OE |
| Environmental Science | EVS |
| Project Work (Non Teaching Credit Course) | NTCC |
| Anandam Project | ANDP |

PROGRAMME STRUCTURE

2021-23

FIRST SEMESTER

| S. No. | Course Title | Category | Lecture (L) | Tutorial (T) | Practical (P) | Total Credits |
|--|---|----------|-------------|--------------|---------------|---------------|
| CORE COURSE (CC) | | | | | | |
| MCS101 | Mathematical Foundation to Computer Science | CC | 2 | 1 | - | 3 |
| MCS102 | Network Security and Cryptography | CC | 2 | 1 | - | 3 |
| MCS103 | Cyber Security -I | CC | 2 | 1 | - | 3 |
| MCS122 | Network Security and Cryptography Lab | CC | - | - | 2 | 1 |
| MCS123 | Cyber Security - I Lab | CC | - | - | 2 | 1 |
| DOMAIN ELECTIVES (DE) | | | | | | |
| Elective-I (Without Lab) | Select any ONE | | | | | |
| MCS131 | Information Security Risk Assessment and Assurance | DE | 2 | 1 | - | 3 |
| MCS132 | Internet Technology | DE | | | | |
| MCS133 | Digital Hardware Modeling | DE | | | | |
| Elective-II (With Lab) | Select any ONE | | | | | |
| MCS134 | Internet of Things | DE | 2 | 1 | - | 3 |
| MCS135 | Secure Protocol Design | DE | | | | |
| MCS136 | Probability and Statistical Structure | DE | | | | |
| MCS144 | Internet of Things LAB | DE | | | | |
| MCS145 | Secure Protocol Design lab | DE | - | - | 2 | 1 |
| MCS146 | Probability and Statistical Structure Lab | DE | | | | |
| Non Teaching Credit Course (NTCC) | | | | | | |
| MCS151 | Report on Workshop / Social Work | NTCC | - | - | - | 1 |
| AND001 | Anandam-I | ANDP | - | - | - | 2 |
| VALUE ADDED COURSES (VAC) | | | | | | |
| BCS111 | Communication Skills-I | VA | 1 | - | - | 1 |
| BSS111 | Behavioural Science-I (Self Development and Interpersonal Skills) | VA | 1 | - | - | 1 |
| FLT111 | Foreign Language French | VA | 2 | - | - | 2 |
| FLG111 | German | VA | | | | |
| FLS111 | Spanish | VA | | | | |
| FLC111 | Chinese | VA | | | | |
| | | VA | | | | |
| | TOTAL | | | | | 25 |

SECOND SEMESTER

| S. No. | Course Title | Category | Lecture (L) | Tutorial (T) | Practical (P) | Total Credits |
|--|---|----------|-------------|--------------|---------------|---------------|
| CORE COURSE (CC) | | | | | | |
| MCS201 | Cyber Forensic | CC | 2 | 1 | - | 3 |
| MCS202 | Cyber Security - II | CC | 2 | 1 | - | 3 |
| MCS203 | Intrusion Detection Systems | CC | 2 | 1 | - | 3 |
| MCS222 | Cyber Security - II Lab | CC | - | - | 2 | 1 |
| MCS223 | Intrusion Detection Systems Lab | CC | - | - | 2 | 1 |
| DOMAIN ELECTIVES (DE) | | | | | | |
| Elective-I (Without Lab) | Select any ONE | | | | | |
| MCS231 | Cyber Laws & Security Policies | DE | 2 | 1 | - | 3 |
| MCS232 | Social Media Security | DE | | | | |
| MCS233 | Biometric Security | DE | | | | |
| Elective-II (With Lab) | Select any ONE | | | | | |
| MCS234 | MATLAB | DE | 2 | 1 | - | 3 |
| MCS235 | Wireless Networks | DE | | | | |
| MCS244 | MATLAB Lab | DE | - | - | 2 | 1 |
| MCS245 | Wireless Networks Lab | DE | | | | |
| OPEN ELECTIVES (OE) | | | | | | |
| | Open Elective | OE | 2 | 1 | - | 3 |
| Non Teaching Credit Course (NTCC) | | | | | | |
| MCS250 | Minor Project | NTCC | - | - | - | 6 |
| AND002 | Anandam-II | ANDP | - | - | - | 2 |
| VALUE ADDED COURSES (VAC) | | | | | | |
| BCS211 | Communication Skills-II | VA | 1 | - | - | 1 |
| BSS211 | Behavioural Science-II (Behavioural Communication and Relationship Management) | VA | 1 | - | - | 1 |
| FLT211 | Foreign Language French | VA | 2 | - | - | 2 |
| FLG211 | German | VA | | | | |
| FLS211 | Spanish | VA | | | | |
| FLC211 | Chinese | VA | | | | |
| | | VA | | | | |
| | TOTAL | | | | | 33 |

THIRD SEMESTER

| S. No. | Course Title | Category | Lecture (L) | Tutorial (T) | Practical (P) | Total Credits |
|--|---|----------|-------------|--------------|---------------|---------------|
| CORE COURSE (CC) | | | | | | |
| MCS301 | Database and Application Security | CC | 2 | 1 | - | 3 |
| MCS302 | Secure Software Engineering | CC | 2 | 1 | - | 3 |
| MCS303 | Ethical hacking and Digital Forensic Tools | CC | 2 | 1 | - | 3 |
| MCS323 | Ethical hacking and Digital Forensic Tools Lab | CC | - | - | 2 | 1 |
| DOMAIN ELECTIVES (DE) | | | | | | |
| Elective-I (Without Lab) | Select any ONE | | | | | |
| MCS331 | Artificial Intelligence and Neural Network | DE | 2 | 1 | - | 3 |
| MCS332 | Human Computer Interaction | DE | | | | |
| MCS333 | Design and Analysis of Algorithms | DE | | | | |
| Elective-II (With Lab) | Select any ONE | | | | | |
| MCS334 | Principles of Virtualization | DE | 2 | 1 | - | 3 |
| MCS335 | Python | DE | | | | |
| MCS344 | Principles of Virtualization Lab | DE | - | - | 2 | 1 |
| MCS345 | Python Lab | DE | | | | |
| OPEN ELECTIVES (OE) | | | | | | |
| | Open Elective | OE | 2 | 1 | - | 3 |
| Non Teaching Credit Course (NTCC) | | | | | | |
| MCS350 | Minor Project | NTCC | - | - | - | 6 |
| MCS351 | Report on Paper Presentation in Conference | NTCC | - | - | - | 1 |
| MCS352 | Summer Internship Project | NTCC | - | - | - | 3 |
| AND003 | Anandam-III | ANDP | - | - | - | 2 |
| VALUE ADDED COURSES (VAC) | | | | | | |
| BCS311 | Communication Skills-III | VA | 1 | - | - | 1 |
| BSS311 | Behavioural Science-III (Leading Through Teams) | VA | 1 | - | - | 1 |
| FLT311 | Foreign Language | | 2 | - | - | 2 |
| FLG311 | French | VA | | | | |
| FLS311 | German | VA | | | | |
| FLC311 | Spanish | VA | | | | |
| | Chinese | VA | | | | |
| | TOTAL | | | | | 36 |

FOURTH SEMESTER

| S. No. | Course Title | Category | Lecture (L) | Tutorial (T) | Practical (P) | Total Credits |
|--|-----------------------|----------|-------------|--------------|---------------|---------------|
| Non Teaching Credit Course (NTCC) | | | | | | |
| Elective | Select any ONE | | | | | |
| MCS460 | Internship | NTCC | - | - | - | 25 |
| MCS461 | Project Work | NTCC | | | | |
| MCS462 | Dissertation | NTCC | | | | |
| | TOTAL | | | | | 25 |

MATHEMATICAL FOUNDATION TO COMPUTER SCIENCE

| Course Code | L | T | P/FW | CREDITS |
|-------------|---|---|------|---------|
| MCS101 | 2 | 1 | - | 3 |

Course Objective:

The aim of the course is to introduce the mathematical underpinnings of theoretical computer science and the theory of computation. Fundamental concepts in discrete mathematics with emphasis on their applications to computer science will be taught.

Course Contents:

Module I

Set Theory: Definition, Types of sets, equality of sets, Subset, Power Set, Universal set, Union, intersection and complement of sets, Algebra of sets, Venn diagram, proof of identities, Application of set theory, Cartesian product of sets, : Relation as Cartesian product of sets, types of relations, Composition of relations, Pictorial representation of relations, equivalence relation, Partial order relation. Definition of function, Types of Functions.

Module II

Algebraic Functions: Properties, Semi group, Monoid, Subgroup, Group, Abelian group, properties of group, Cyclic group, Permutation group, Homomorphism.

Module III

Graph Theory and Tree

Basic Terminology, Walks, paths, circuits, connectedness, Handshaking Lemma, Isomorphism, Sub graphs, and Union of Graphs, Reach ability, Eulerian Graph and Union of Graphs, Eulerian Graph, Shortest path problem, , Hamiltonian graph, Traveling Salesman Problem, Bipartite graphs. Introduction to trees, Rooted trees, path length in rooted trees, spanning trees, , spanning trees of a weighted graph, cut sets and cut vertices, , Minimum spanning tree.

Module IV

Propositional Logic

Proposition, First order logic, Basic Logical operations, Tautologies, Contradictions, Algebra of Proposition. Logical implications and Double implications, Arguments. Mathematical Induction, Recurrence Relation.

Module V

Combinatorics

Theorem and Binomial Coefficient, Pascal's Triangle, Permutations, Permutation with Repetition, Combinations, Ordered and Unordered Permutations.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:

Text:

- Lipschutz, Seymour, "Discrete Mathematics", TMH.

References:

- Trembley, J.P & R. Manohar, "Discrete Mathematical Structures with Application to Computer Science", TMH
- Kenneth H. Rosen, "Discrete Mathematics and its applications", TMH.
- Doerr Alan & Levasseur Kenneth, "Applied Discrete Structure for Computer Science". Galgotia Pub Pvt Ltd.
- Gersting, "Mathematical Structure for Computer Science", WH Freeman & M Macmillan.

- Kumar Rajendra, “Theory of Automata : Language and Computation”, PPM.
- C.L. Liu, “Elements of Discrete Mathematics”, McGraw Hill.
- Peter Grossman, “Discrete Mathematics for Computer “, Palgrave Macmillian.

NETWORK SECURITY AND CRYPTOGRAPHY

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS102 | 2 | 1 | - | 3 |

Course Objective:

The goal of this course is to introduce the fundamental networking concepts, technologies as well as the understanding of encryption and decryption algorithm.. This course will assist you in developing the skills necessary to plan implement and secure the small networks across a range of applications.

MODULE I: Physical Layer and Data Link Layer

Physical Layer : The Physical Layer-Communication Signals, Physical Signaling and Encoding, Representing Bits, Physical Media-Connecting Communication. **Data Link Layer** : Introduction, Data Link Layer-Accessing the media .Media Access Control Techniques, Media Access Control Addressing and Framing Data.

MODULE II: Network Layer and Transport Layer

Network Layer Networks-dividing host into groups, Routing –How our data packets are handled, Routing process. LANs, WANs and Internetworks Network Addressing. **Transport Layer** : The TCP protocol –communicating with reliability, Managing TCP sessions, The UDP protocol communicating with low overheads

MODULE III: Application Layer

Application Layer Functionality and Protocols : Provision for applications and services, Application layer protocols and services. Overview of Ethernet, Ethernet –Communication through the LAN, The Ethernet Frame ,Ethernet Media Access Control, Ethernet Physical Layer, Hubs and Switches, Address Resolution Protocol(ARP)

MODULE IV: Cryptography Algorithms

Introduction: Attacks, Services and Mechanisms, Security attacks, Security services, A Model for Internetwork security. Classical Techniques: Conventional Encryption model, Steganography, Classical Encryption Techniques.

Modern Techniques: Simplified DES, Block Cipher Principles, Data Encryption standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operations. Algorithms: Triple DES,

MODULE V: Asymmetric cryptography

Public Key Cryptography: Principles, RSA Algorithm, Key Management, Diffie-Hellman. Message authentication and Hash functions. , Message Digest Algorithm. Digital signatures, Kerberos, X.509.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|----------------------|------------|-------------------|------------|-------------|-------------|-----------|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:***Text:***

- Cisco Networking Academy Programme CCNA 1 & 2 Companion Guide, 3rd Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Lab Companion, 3rd Edn by Pearson Education
- William Stallings, Cryptography and Network Security Principles and Practices, 5th Edition, PHI/Pearson, 2011.
- William Stallings, Network Security Essentials Applications and Standards, 4th Edition, Pearson Education, 2011.
- Christof Paar and Jan Pelzl , Understanding Cryptography – A Textbook for Students and Practitioners Christof Paar and Jan Pelzl, Springer, 2010

References:

- Data Communications and Networking by Behrouz Forouzan, 3e, Tata McGraw-Hill
- Computer Networks by Andrews S. Tanenbaum, 4e, Pearson Education
- Eric Maiwald, Fundamentals of Network Security, 1 Edition, Dreamtech press, 2008.
- Charlie Kaufman, Radia Perlman and Mike Speciner, Network Security Private Communication in a Public World, 2nd Edition, Pearson/PHI, 2009.
- Whitman, Principles of Information Security, 3rd Edition, Thomson, 2008.

CYBER SECURITY - I

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS103 | 2 | 1 | - | 3 |

Module I: Introduction to Operating System and Linux: Basic Elements of OS, OS Functions, Types of OS, OS Terminologies, Linux Command Line, Linux Features, Basic Navigation, Files and Directories, Manual Pages, File Manipulation, Wildcards, Permissions, File Hierarchy, Filters, Grep and Regular Expressions, Piping and Redirection, Process Management, User Management, File Security, Shell Scripting, Security in Operating Systems.

Module II: Information and Access Controls

Types of Security, Information Classification and their levels, Process for managing classified information, Access Control, Types of Access Control - Preventative access control, Deterrent access control, Detective access control, Corrective access control, Recovery access control, Compensation access control, Directive access control, Administrative access controls, Logical/technical access controls, Physical access controls.

Module III: Cyber Security Tools

Cyber Security Goals, Tools for Confidentiality - Encryption, Access control, Authentication, Authorization, Physical Security, Tools for Integrity - Backups, Checksums, Data Correcting Codes, Tools for Availability - Physical Protections, Computational redundancies.

Module IV: Cyber Security Attacks

Types of Cyber Security Attacks, Web-based Attacks (Injection Attack, DNS Spoofing, Session Hijacking, Phishing, Brute Force, Denial of Service, Distributed Denial of Service, Dictionary Attack, URL Interpretation, File Inclusion Attack, Man in the Middle Attack), System-based Attack (Virus, Worm, Trojan Horse, Backdoors, Bots), Types of Cyber Attackers.

Module V: Database Management and Security

Data, Information, and Knowledge, Database (DB), Database Management System (DBMS), DB Characteristics, DB Users, DBMS Architecture, DBMS Models, DB Relationships, SQL Overview, DML, DDL, and DCL commands, Security in Database and its Design Consideration.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts Essentials", 2 Edition, Wiley, 2014.

William E. Shotts, Jr., "The Linux Command Line: A Complete Introduction", No Starch Press, 2012.

Crystal Panek, "Security Fundamentals", John Wiley and Sons, 2019.

Charles J. Brooks, Christopher GrowPhilip Craig, "Cybersecurity Essentials", John Wiley and Sons, 2018

Mark L. Gillenson, "FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS", Wiley, 2008.

Alan Beaulieu, "Learning SQL: Master SQL Fundamentals", O'Reilly, 2009

References:

William Stallings, "Operating Systems: Internals and Design Principles", Prentice Hall, 2009.

John Purcell, Robert Kiesling, "Linux: The Complete Reference", LinuxSystem Labs, 1998.

Chuck Easttom, "Computer Security Fundamentals", Pearson, 2011.

C. J. Date, "An Introduction to Database Systems", Addison-Wesley, 2000.

Martin Gruber, "Mastering SQL", SYBEX, 2000

NETWORK SECURITY AND CRYPTOGRAPHYLAB

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS122 | - | - | 2 | 1 |

The Lab Manual is designed for the implementation of protocols in lab. The exercises in the Lab Manual correspond to course and are for use in a classroom setting supervised by an instructor. The Lab Manual presents a rich, hands-on learning experience that encourages practical solutions and strengthens critical problem-solving skills:

List of Experiments

1.0 Observing TCP and UDP using Netstat

- Explain common **netstat** command parameters and outputs.
- Use **netstat** to examine protocol information on a pod host computer.

2.0 TCP/IP Transport Layer Protocols, TCP and UDP

- Identify TCP header fields and operation
- Identify UDP header fields and operation

3.0 Application and Transport Layer Protocols Examination

- Configure the host computer to capture Application layer protocols.
- Capture and analyze HTTP communication between the pod host computer and a web server.
- Capture and analyze FTP communication between the pod host computer and an FTP server.
- Observe TCP establish and manage communication channels with HTTP and FTP connections

4.0 Examining a Device's Gateway

- Understand and explain the purpose of a gateway address.
- Understand how network information is configured on a Windows computer.
- Troubleshoot a hidden gateway address problem

6.0 Examining a Route

- Use the **route** command to modify a Windows computer routing table.
- Use a Windows Telnet client command **telnet** to connect to a Cisco router.
- Examine router routes using basic Cisco IOS commands.

7.0 Ping and Traceroute

- Use the **ping** command to verify simple TCP/IP network connectivity.
- Use the **tracert/traceroute** command to verify TCP/IP connectivity.

8.0 IPv4 Address Subnetting Scenario

When given an IP address, network mask, and subnetwork mask, you will be able to determine other information about the IP address such as:

- The subnet address of this subnet
- The broadcast address of this subnet
- The range of host addresses for this subnet

9.0 Implement the encryption and decryption through Cryp Tool.

- Caesar cipher
- Shift cipher
- Affine cipher
- Substitution with symbols
- Vigen`ere cipher
- Hill cipher

10.0 Applications of asymmetric cryptography

- One-way functions
- The Diffie-Hellman key exchange protocol
- The RSA procedure

Examination Scheme:

| IA | | | | EE | |
|----|----|----|----|----|----|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

CYBER SECURITY - I LAB

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS123 | - | - | 2 | 1 |

Experiments

1. Installation of LINUX Operating System
2. Implementation of general purpose utilities commands.
3. Implementation of user & session management commands.
4. Implementation of file system navigation commands, text processing tools, communication commands.
5. Write a shell script program to display “HELLO WORLD”.
6. Write a shell script program to develop a scientific calculator.
7. Write a shell script program that prompts the user for the password. The user has maximum of 3 attempts. If the user enters the correct password, the message “Correct Password” is displayed else the message “Wrong Password”.
8. Write a program to generate all combinations of 1, 2 and 3 using for loop.
9. Write a shell script program that will receive any number of filenames as arguments. The shell script should check whether such files already exist. If they do, then it should be reported. The files that do not exist should be created in a sub-directory called mydir. The shell script should first check whether the sub-directory mydir exists in the current directory. If it doesn't exist, then it should be created. If mydir already exists, then it should be reported along with the number of files that are currently present in mydir.
10. Write a Shell Script program to show the implementation of positional parameters.
11. Write a grep/egrep shell script program to find the number of words character, words and lines in a file.
12. Shell Script program to implement read, write, and execute permissions.
13. Implement SQL DDL Commands (Create, Drop, Alter, Truncate)
14. Implement SQL DML Commands (Select)
15. Implement SQL DCL Commands (Grant, Revoke)
16. Implement SQL TCP Commands (Commit, Rollback)

Examination Scheme:

| IA | | | | EE | |
|----|----|----|----|----|----|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

INFORMATION SECURITY RISK ASSESSMENT AND ASSURANCE

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS131 | 2 | 1 | - | 3 |

Module I: Introduction

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access.

MODULE II Myths Of Information Security Management

The big picture-Learning from experience-Weaknesses in Information Security-The extent of crime in cyberspace- The cyberspace crime syndrome-Policies and technologies- A new framework for information security.

MODULE III Information Security Assessments

Risk assessment-methodology- Generations of risk assessment techniques- Quantitative approach to risk assessment-Problems with Quantitative approach – NIST ALE- Baseline approach.

MODULE IV Security Management Concepts And Principles

Measuring ROI on security- Security patch management- Purposes of Information Security management- The building blocks of information security- Human side of information security- Security management- Securing new information technology.

MODULE V Risk Assessment

What is Risk? –Information Security Risk Assessment Overview- Drivers, Laws and Regulations- Risk Assessment Frame work – Practical Approach. System Risk Analysis- Risk Prioritization- System Specific Risk Treatment- Issue Registers- Methodology- Result- Risk Registers- Post Mortem.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

1. Donn Parkers, “Fighting Computer Crime: “A New Framework for Protecting Information”, John Wiley & Sons, 2003.
2. Micki Krause, Harold F.Tripton, “Information Security Management Handbook”, Auerbach Publications, 2012.
3. Mark Talabis, “Information Security Risk Assessment Toolkit: Practical Assessments through Data Collection and Data Analysis”, Kindle Edition. ISBN: 978-1-59749-735-0.
4. David L. Cannon, “CISA Certified Information Systems Auditor Study Guide”, SYBEX Publication. ISBN: 978-0-470-23152-4.

INTERNET TECHNOLOGY

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS132 | 2 | 1 | - | 3 |

MODULE I

INTRODUCTION: What the Internet is; History and Timeline; Technologies and Services; Basic Operating System Utilities; ping and traceroute; RFCs; Brief overview of computer networking concepts: architecture, layers, packets, data transmission.

BASIC NETWORK PROGRAMMING: Comer's simple networking API; Java's java.net package; examples using each API.

MODULE II

INTERNETWORKING WITH ETHERNET, IP, ARP, ICMP: Ethernet details (addressing, frame format, twisted pair, hubs, switches); Routers, Gateways. IP Addresses, Subnets, ARP. IP Headers, IP Routing (fragmentation and reassembly), ICMP.

UDP, TCP, AND SOCKETS: Network service types, ports and sockets; UDP: header format, etc.; TCP: header format, window, connection setup, etc. Socket API, Java Socket Programming.

APPLICATION-LEVEL PROTOCOLS DNS, SMTP, POP, FTP, HTTP: Headers, Formats, Operations of each. Mailing Gateways, Mailing Lists, URIs.

MODULE III

XML: Markup, Elements, Attributes, Tags, Entity References, etc. Formal specifications. Examples. DTDs, Namespaces, All about XHTML, XSLT, XPath, XLinks, XPointers, CSS, Schemas, SAX and DOM.

WEB BROWSER AND WEB SERVER ARCHITECTURES: Browser architectures and client-side extensions such as plug-ins, Java applets, and JavaScript. Server architectures, operation, performance issues, caching, server-side extensions such as CGI, Servlets, JSP, PHP, Apache modules, etc. Proxies.

MODULE IV

INTERNET SECURITY: Basic Security Concepts, Strategies for securing assets, Computer Security vs. Network Security; Kinds of attacks; Firewalls: architecture, implementation and configuration, DMZ and external routers; Packet sniffing, packet filtering, etc; Cryptography and Cryptographic Protocols: Public-Key encryption, authentication schemes, SSL, IPSEC, VPNs; Java Security and Cryptography APIs.

SCALING AND AVAILABILITY: Availability, Fault-Tolerance, Load Balancing, Points of Failure; Clusters; Disaster Recovery.

MODULE V

ARCHITECTURE AND IMPLEMENTATION OF ENTERPRISE SYSTEMS: Tiered architecture for the enterprise: 2-tier vs. 3-tier. J2EE Technologies emphasizing JDBC, Transactions, XML and Enterprise Java Beans. EJB details: session vs. entity beans; persistence mechanisms. Implementation of complete system from servlets through EJBs through a database.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

1. Douglas E. Comer ,”Internetworking with TCP/IP, Principles, Protocols, and Architecture”, Addison-Wesley, 5th edition, Vol 1, 2005,ISBN-10: 0131876716 | ISBN-13: 978-0131876712 .
2. Douglas E. Comer, David L. Stevens ,”Internetworking with TCP/IP Vol. III, Client-Server Programming and Applications”, Addison-Wesley, 2nd edition, 2000 , ISBN-10: 013260969X,

ISBN-13: 978-0132609692. 3. Wendell Odom,” CCNP Route 642-902, CCIE”, Official Certification Guide, Pearson.

3. Behrouz A. Forouzan, “Data Communications and Networking”, McGraw-Hill, 5th edition, 2012, ISBN- 10: 0073376221, ISBN-13: 978-0073376226

DIGITAL HARDWARE MODELING

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS133 | 2 | 1 | - | 3 |

MODULE I

Introduction to digital circuit design flow, Design Representation, VLSI Design Styles, Verilog variables, operators and language constructs, verilog modeling examples.

MODULE II

Modeling combinational circuits using Verilog, verilog description styles, Modeling sequential circuits using Verilog, procedural assignment, user defined primitives.

MODULE III

Verilog test benches and design simulation, modeling finite state machines, Behavioral versus structural design modeling, datapath and controller design, synthesizable verilog.

MODULE IV

Modeling memory, modeling register banks, modeling issues: pipelining, memory, switch level modeling

MODULE V:

Processor design using verilog, pipeline implementation of a processor, verilog modeling of the processor

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

1. J. Bhasker, "Verilog HDL Synthesis: A Practical Primer", B. S. Publications, 1998.
2. M. D. Ciletti, "Advanced VLSI Design with the Verilog HDL", Prentice-Hall of India, 2005.

INTERNET OF THINGS

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|--------------------|----------|----------|-------------|---------------------|
| MCS134 | 2 | 1 | - | 3 |

MODULE I

Introduction to IoT- Internet of Things & their characteristics, Design- Physical & Logical design, IoT Reference Model- Domain Model, Information Mode, Functional Model, and Communication Model. M2M and IoT technology fundamentals.

MODULE II

Sensor Technology- Introduction to wireless sensor networks, Sensor nodes- Sensing and sensors, Challenges and Constraints, Communication Interfaces- Protocols, Application of Wireless sensors.

MODULE III

Embedded System- Introduction to embedded systems, Application Areas, Categories of embedded systems, Overview of embedded system, Architecture of embedded systems, Hardware architecture, Software architecture, Application Software, Communication Software.

MODULE IV

Domain Specific Application Categories- Big Data Analytics for IoT, Privacy and Security in IoT, Smart City, Cloud Storage & Computing.

MODULE V

Programming & Interfacing- Open Source Platforms: PIC, Arduino, Sketch and Raspberry Pi. Getting used to Arduino, Sensor Characterization- Safety, Basic Electronics (circuit theory, measurements, parts identification). Sensors and Software- Understanding Processing Code Structure, variables and flow control, interfacing to the Real World.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|----------------------|------------|-------------------|------------|-------------|-------------|-----------|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
2. WalteneusDargie, Christian Poellabauer , "Fundamentals of Wireless Sensor Networks, Theory and Practice", Wiley Series on wireless Communication and Mobile Computing, 2011
3. Arnold. S. Berger, "Embedded Systems Design - An introduction to Processes, Tools and Techniques", Easwer Press, 2001
4. Programming Interactivity, Second Edition By Josha Noble, 2012

SECURE PROTOCOL DESIGN

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS135 | 2 | 1 | - | 3 |

MODULE I

OSI: ISO Layer Protocols:-Application Layer Protocols-TCP/IP, HTTP, SHTTP, LDAP, MIME,- POP& POP3-RMON-SNTP-SNMP. Presentation Layer Protocols-Light Weight Presentation Protocol Session layer protocols.

MODULE II

RPC protocols-transport layer protocols-ITOT, RDP, RUDP, TALI, TCP/UDP, compressed TCP. Network layer Protocols – routing protocols-border gateway protocol-exterior gateway protocol-internet protocol IPv4- IPv6- Internet Message Control Protocol- IRDPTransport Layer Security-TSL-SSL-DTLS.

MODULE III

Data Link layer Protocol – ARP – In ARP – IPCP – IPv6CP – RARP – SLIP .Wide Area and Network Protocols- ATM protocols – Broadband Protocols – Point to Point Protocols – Other WAN Protocols- security issues.

MODULE IV

Local Area Network and LAN Protocols – ETHERNET Protocols – VLAN protocols – Wireless LAN Protocols – Metropolitan Area Network Protocol – Storage Area Network and SAN

MODULE V

Protocols -FDMA, WIFI and WIMAX Protocols- security issues. Mobile IP – Mobile Support Protocol for IPv4 and IPv6 – Resource Reservation Protocol. Multicasting Protocol – VGMP – IGMP – MSDP .Network Security and Technologies and Protocols – AAA Protocols – Tunneling Protocols – Secured Routing Protocols – GRE- Generic Routing Encapsulation – IPSEC – Security.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

1. Jawin: “Networks Protocols Handbook”, 3rd Edition, Jawin Technologies Inc., 2005.
2. Bruce Potter and Bob Fleck : “802.11 Security”, 1st Edition, O’Reilly Publications, 2002.

References:

1. Ralph Oppliger :“SSL and TSL: Theory and Practice”, 1st Edition, Arttech House, 2009.
2. Lawrence Harte: “Introduction to CDMA- Network services Technologies and Operations”, 1st Edition, Althos Publishing, 2004.
3. Lawrence Harte: “Introduction to WIMAX”, 1st Edition, Althos Publishing, 2005.

PROBABILITY AND STATISTICAL STRUCTURE

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS136 | 2 | 1 | - | 3 |

Course Objective:

The aim of the course is to introduce the probability and statistical of theoretical computer science and the theory of statistical analysis. Fundamental concepts in statistical analysis with emphasis on their applications to computer science will be taught.

Course Contents:

Module -I:

Probability: Sample space and events – Probability – The axioms of probability - Some elementary theorems - Conditional probability – Baye's theorem.

Module -II:

Random variables – Discrete and continuous – Distribution – Distribution function. Distribution - Binomial, poisson and normal distribution – related properties.

Module -III:

Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.

Module-IV:

Test of Hypothesis – Means and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests. Tests of significance – Student's t-test, F-test, chi-square test, ANOVA test.

Curve fitting: The method of least squares – Inferences based on the least squares estimations - Curvilinear regression – multiple regressions – correlation for univariate and bivariate distributions.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

TEXT BOOKS:

1. Probability and statistics for engineers:Erwin Miller And John E.Freund. Prentice-Hall of India / Pearson , Sixth edition.
2. Text book of Probability and Statistics by Dr.ShahnazBathul, V.G.S.Publishers 2003.

REFERENCE BOOKS:

1. Probability, Statistics and Random Processes Dr.K.Murugesan&P.Gurusamy by Anuradha Agencies, Deepti Publications.
2. Advanced Engineering Mathematics (Eighth edition), Erwin Kreyszig, John Wiley and Sons (ASIA) Pvt. Ltd., 2001.
3. Probability and Statistics for Engineers: G.S.S.BhishmaRao,sitech., Second edition 2005.

INTERNET OF THINGS LAB

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|---------------|---|---|----------|--------------|
| MCS144 | - | - | 2 | 1 |

1. Arduino Installation and Setup Guide
2. Creating REST APIs and Using Them To Send and Receive Sensor Data
 - a. Installing Python
 - b. Installing MongoDB
 - c. Installing Postman (REST API Client)
 - d. Installing Robomongo
 - e. Installing Flask (Python Micro framework)
 - f. Installing Flask_bcrypt library
 - g. Installing Pymongo library
3. Installing REST APIs
 - a. App.py
 - b. IoT API
 - c. IoT Endpoint API
 - d. Models.py
4. Data Analytics
 - a. Insert Sample Data in MongoDB
 - b. To Insert Data to Database from a Local File
 - c. Performing MapReduce
 - d. Creating a Web Service to Fetch Data from Mongo DB
 - e. Performing Visualization on Fetched Data
5. Demonstrate the working of Embedded Programming Class.
6. Demonstrate the working of Sensor Calibrations and Usage.
7. Demonstrate the working of Protocol Implementations.
8. Demonstrate the working of Java/Python Programming Class.
9. Demonstrate the working of Big Data Programming Class.
10. Demonstrate the working of Analytics Programming Class.
11. Demonstrate the working of Web Services Programming Class.
12. Demonstrate the working of Cloud based Application Development.
13. Demonstrate the working of C Programming Class.
14. Demonstrate the working of Arduino/Raspberry Pi Programming Class.

Examination Scheme:

| IA | | | | EE | |
|----|----|----|----|----|----|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

SECURE PROTOCOL DESIGN LAB

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|--------------------|----------|----------|-------------|---------------------|
| MCS145 | - | - | 2 | 1 |

1. Designing Remote Connectivity
2. Designing IP Addressing
3. Selecting Routing Protocols
4. Voice Network Design
5. Wireless Network Design
6. Designing Security Solutions
7. Installation and Configuration of Linux
8. Linux Systems Administration
9. Understanding Shells and Scripting with Linux
10. Setting up Samba and a Windows-Linux network
11. Setting up security with Linux
12. Setting up a Web Server
13. Learn the fundamentals of wireless LAN
14. Learn various standards related to wireless LANs
15. Learn about the security aspects of wireless LANs.

Examination Scheme:

| IA | | | | EE | |
|-----------|-----------|-----------|----------|-----------|----------|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROBABILITY AND STATISTICAL STRUCTURE LAB

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|--------------------|----------|----------|-------------|---------------------|
| MCS146 | - | - | 2 | 1 |

1. Frequenciesanalysis
2. Descriptiveanalysis
3. Crosstabsanalysis
4. One Sample t – Testanalysis
5. Independent Sample t – Test
6. Paired Sample t – Testanalysis
7. One-Way ANOVAanalysis
8. Chi – Square Testanalysis
9. correlation analysis
10. Multiple Regressionanalysis

Examination Scheme:

| IA | | | | EE | |
|-----------|-----------|-----------|----------|-----------|----------|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

REPORT ON WORKSHOP/ SOCIAL WORK

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS 151 | - | - | - | 1 |

Objective: Conferences / Seminars / Workshop are good and efficient way to get to know other researchers through their work and also personally. The educational aspect can expose the students to new ways of conducting the business and help them to discover how to be more productive. They provide a great opportunity to network. Collaboration is the way to approach networking.

Rules and Regulations

- 2nd Year / 3rd Year Students for which the students and the faculty members can start preparations well in advance prior to the scheduled conference / seminar / workshop.
- The number of students going for any conference / seminar / workshop should be manageable.
- A proposal for the proposed conference / seminar / workshop should be drafted and presented to the HoI reflecting the following key points:
 - Entire activity plan
 - Route Map
 - What are the objectives for the students?
 - What they need to learn, do, and prepare before the conference / seminar / workshop?
 - List of prospective students with Contact Details
 - List of Faculty Coordinators with Contact Details
- After getting approval from the HoI, a note sheet should be prepared and all necessary permission and approval from the competent authorities should be obtained.
- The attention and co-operation of all students and parents are requested to attend the conference / seminar / workshop most effectively. Signing of the letter of Indemnity Bond (Consent-cum-Undertaking) is mandatory for all the parents of students going for conference / seminar / workshop in or outside Jaipur. Duly executed Indemnity Bond should be submitted to HoI Office at least 2 days prior to the visit, without which the accompanying Staff coordinator shall not permit the student to participate in the industrial visit
- The list of students participating in conference / seminar / workshop shall be handed over to the concerned HODs, Staff coordinators.
- Students should be present in formals.
- Students should carry the College Identity Cards during their journey.
- Discipline should be maintained during the conference / seminar / workshop. Any violation will be viewed very seriously.
- A report of the conference / seminar / workshop is to be submitted in 5 days time by students / faculty coordinators once the students are back.

The report to be prepared should reflect the following:-

- What happened at the conference / seminar / workshop the students attend and how does it relate in the best way to the preparations and the learning objectives.
- How do the students will use the outcome of conference / seminar / workshop after it is over?
- What will they gain from it and how can they set up activities that transfer the experience into learning?
- Evaluation parameters for the success of the experience of conference / seminar / workshop.

The layout guidelines for the Report:

1. File should be in the following specification:

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components:

- Front Page
- Table of Content
- Acknowledgement
- Student Certificate
- Company Profile (optional)
- Introduction
- Main Body
- References / Bibliography

ASSESSMENT OF THE INTERNSHIP FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Report File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

Examination Scheme:

| Components | V | S | R | FP |
|----------------------|----------|----------|----------|-----------|
| Weightage (%) | 20 | 20 | 20 | 40 |

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

COMMUNICATION SKILLS-I

| CODE | L | T | P/FW | CREDITS |
|----------------|----------|----------|----------|----------|
| BCS 111 | 1 | - | - | 1 |

Course Objective:

The Course is designed to give an overview of the four broad categories of English Communication thereby enhance the learners' communicative competence.

Course Contents:

Module I: Listening Skills

Effective Listening: Principles and Barriers

Listening Comprehension on International Standards

Module II: Speaking Skills

Pronunciation and Accent

Reading excerpts from news dailies & magazines

Narrating Incident; Story telling.

Extempore & Role Plays

Module III: Reading Skills

Vocabulary: Synonyms, antonyms, diminutives, homonyms, homophones

Idioms & phrases

Foreign words in English

Module IV: Writing Skills

Writing Paragraphs

Précis Writing

Letter writing

Coherence and structure

Essay writing

Module V: Activities

News reading

Picture reading

Movie magic

Announcements

Examination Scheme:

| Components | CT1 | CT2 | CAF | V | GD | GP | A |
|----------------------|-----|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 25 | 10 | 10 | 10 | 5 |

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Working in English, Jones, Cambridge
- Business Communication, Raman –Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge

BEHAVIOURAL SCIENCE-I

(Self Development and interpersonal Skills)

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| BSS 111 | 1 | - | - | 1 |

Course Objective:

This course aims at imparting an understanding of:

Self and the process of self exploration

Learning strategies for development of a healthy self esteem

Importance of attitudes and their effect on work behaviour

Effective management of emotions and building interpersonal competence.

Course Contents:

Module I: Understanding Self

Formation of self concept

Dimension of Self

Components of self

Self Competency

Module II: Self-Esteem: Sense of Worth

Meaning and Nature of Self Esteem

Characteristics of High and Low Self Esteem

Importance & need of Self Esteem

Self Esteem at work

Steps to enhance Self Esteem

Module III: Emotional Intelligence: Brain Power

Introduction to EI

Difference between IQ, EQ and SQ

Relevance of EI at workplace

Self assessment, analysis and action plan

Module IV: Managing Emotions and Building Interpersonal Competence

Need and importance of Emotions

Healthy and Unhealthy expression of emotions

Anger: Conceptualization and Cycle

Developing emotional and interpersonal competence

Self assessment, analysis and action plan

Module V: Leading Through Positive Attitude

Understanding Attitudes

Formation of Attitudes

Types of Attitudes

Effects of Attitude on

Behaviour

Perception

Motivation

Stress

Adjustment

Time Management

Effective Performance

Building Positive Attitude

Module VI: End-of-Semester Appraisal

Viva based on personal journal

Assessment of Behavioural change as a result of training

Exit Level Rating by Self and Observer

Examination Scheme:

| Components | SAP | A | Mid Term Test (CT) | VIVA | Journal for Success (JOS) |
|---------------|-----|----|--------------------|------|---------------------------|
| Weightage (%) | 20 | 05 | 20 | 30 | 25 |

Text & References:

- Towers, Marc: Self Esteem, 1st Edition 1997, American Media
- Pedler Mike, Burgoyne John, Boydell Tom, A Manager's Guide to Self-Development: Second edition, McGraw-Hill Book Company.
- Covey, R. Stephen: Seven habits of Highly Effective People, 1992 Edition, Simon & Schuster Ltd.
- Khera Shiv: You Can Win, 1st Edition, 1999, Macmillan
- Gegax Tom, Winning in the Game of Life: 1st Edition, Harmony Books
- Chatterjee Debashish, Leading Consciously: 1998 1st Edition, Viva Books Pvt. Ltd.
- Dr. Dinkmeyer Don, Dr. Losoncy Lewis, The Skills of Encouragement: St. Lucie Press.
- Singh, Dalip, 2002, Emotional Intelligence at work; First Edition, Sage Publications.
- Goleman, Daniel: Emotional Intelligence, 1995 Edition, Bantam Books
- Goleman, Daniel: Working with E.I., 1998 Edition, Bantam Books.

FRENCH

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLT 111 | 2 | - | - | 2 |

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2

Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française: (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical: 1. organisation générale de la grammaire

2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation: Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
Interro-négatif: réponses: oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|---------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLG 111 | 2 | - | - | 2 |

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction

Self introduction: heissen, kommen, wohnen, lernen, arbeiten, trinken, etc.

All personal pronouns in relation to the verbs taught so far.

Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),

Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel

To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics

Sound system of the language with special stress on Diphthongs

Module IV: Countries, nationalities and their languages

To make the students acquainted with the most widely used country names, their nationalities and the language spoken in that country.

Module V: Articles

The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions

To acquaint the students with professions in both the genders with the help of the verb “sein”.

Module VII: Pronouns

Simple possessive pronouns, the use of my, your, etc.

The family members, family Tree with the help of the verb “to have”

Module VIII: Colours

All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb “kosten”

The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.

“Wie viel kostet das?”

Module X: Revision list of Question pronouns

W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|----------------------|------------|------------|----------|----------|----------|----------|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLS 111 | 2 | - | - | 2 |

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other, how to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I

A brief history of Spain, Latin America, the language, the culture...and the relevance of Spanish language in today's global context.

Introduction to alphabets

Module II

Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).

Goodbyes (*despedidas*)

The verb *llamarse* and practice of it.

Module III

Concept of Gender and Number

Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV

Introduction to *SER* and *ESTAR* (both of which mean To Be). Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that Spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V

Time, demonstrative pronoun (*Este/esta, Aquel/aquella* etc)

Module VI

Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|---------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLC 111 | 2 | - | - | 2 |

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Show pictures, dialogue and retell.

Getting to know each other.

Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called “Hanyu Pinyin” in Mandarin Chinese.)

Practicing of Tones as it is a tonal language.

Changes in 3rd tone and Neutral Tone.

Module II

Greetings

Let me Introduce

The modal particle “ne”.

Use of Please ‘qing’ – sit, have tea etc.

A brief self introduction – Ni hao ma? Zaijian!

Use of “bu” negative.

Module III

Attributives showing possession

How is your Health? Thank you

Where are you from?

A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.

Are you busy with your work?

May I know your name?

Module IV

Use of “How many” – People in your family?

Use of “zhe” and “na”.

Use of interrogative particle “shenme”, “shui”, “ma” and “nar”.

How to make interrogative sentences ending with “ma”.

Structural particle “de”.

Use of “Nin” when and where to use and with whom. Use of guixing.

Use of verb “zuo” and how to make sentences with it.

Module V

Family structure and Relations.

Use of “you” – “mei you”.

Measure words

Days and Weekdays.

Numbers.

Maps, different languages and Countries.

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|----------------------|------------|------------|----------|----------|----------|----------|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation, I – Interaction/Conversation Practice

Text & References:

“Elementary Chinese Reader Part I” Lesson 1-10

CYBER FORENSICS

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS201 | 2 | 1 | - | 3 |

Course Objective:

The objective of this course is to provide identification, preservation, and extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered, and preparation of expert testimonial evidence.

Course Contents:

Module I: Computer Forensics Fundamentals

Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Stages of forensic investigation: Types of Computer Forensic Technology, Military, Law Enforcement, Business, Specialized Forensic Techniques; Types of Computer Forensics Systems: Internet Security, Intrusion Detection, Firewall Security, Public Key Infrastructure, Net Privacy, Identity Theft, Biometric Security Systems; .Data Recovery :Data Backup,- Recovery and Solution, Hiding and Recovering Hidden Data, Evidence Collection and Data Seizure, Types of Evidence: General Procedure, Collection and Archiving,

Module II: Mobile Forensics

Crime and mobile phones, evidences, forensic procedures, files present in SIM card, device data, external memory dump and evidences in memory card, operators systems Android forensics: Procedures for handling an android device, imaging android USB mass storage devices, logical and physical techniques.

Module III: Network Forensics

Collecting Network Based Evidence - Investigating Routers - Network Protocols - Email Tracing - Internet Fraud.

Module IV: Analysis of Digital Forensic Techniques

Digital forensics examination principles: Previewing, imaging, continuity, hashing and evidence locations- Seven element security model- developmental model of digital systems- audit and logs- Evidence interpretation: Data content and context.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:

Text:

- Skoudis.E, Perlman. R. Counter Hack: “A Step-by-Step Guide to Computer Attacks and Effective Defenses”, .Prentice Hall Professional Technical

References:

- Eoghan Casey, "Handbook Computer Crime Investigation's Forensic Tools and Technology", Academic Press, 1st Edition, 2001.
- Norbert Zaenglein, “Disk Detective: Secret You Must Know to Recover Information From a Computer”, Paladin Press, 2000.

CYBER SECURITY - II

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|--------------------|----------|----------|-------------|---------------------|
| MCS202 | 2 | 1 | - | 3 |

MODULE- I : CYBER SECURITY PRINCIPLES AND TECHNOLOGY

Cyber Security Principles, Data Security Consideration, Firewalls, Types of Firewalls, Basics of Virtual Private Network, Basics of Intrusion Detection, Access Control, Digital Signature and Types of Digital Signature.

MODULE- II : THREATS AND ATTACKS IN E-PAYMENT

Introduction to E-Payment Security, Importance of Security in E- Payment, Common threats and attacks in E- Payment, Case Studies of Threats associated with E-Cash, Debit Card, Credit Card, Smart Card, ATM Machines, Mobile Payment, E-Wallet, Online Banking, SMS Banking.

MODULE- III : SECURE INFORMATION SYSTEM

Importance, Development of secure information system, Key Elements of an Information Security Policy – Purpose, Scope, Information Security Objectives, Security Awareness, Information Security Development Lifecycle.

MODULE- IV : CYBER SECURITY POLICES AND STANDARDS

Introduction to Security Policies, Need for Security Policy, Stakeholders of Policy Makers, Security Policy Audit, Security Policy Enforcement, Security Policy Awareness, Importance of Security Standards, ISO/IEC 27001 and 27002, NIST Cyber Security Framework, Common Criteria.

MODULE- V : CYBER SECURITY CHALLENGES AND RISK ANALYSIS

Introduction to Cyber Security Challenges, Challenges associated with the evolution of ransom ware, block chain, Internet of Things (IoT), Artificial Intelligence, Server less Apps, Security Analysis Benefits and Steps, Quantitative and Qualitative Security Risk Analysis.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|----------------------|------------|-------------------|------------|-------------|-------------|-----------|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

Charles J. Brooks, ,Christopher GrowPhilip Craig, "Cybersecurity Essentials", John Wiley .and Sons, 2018

MayankBhusan, Rajkumar Singh Rathore, AatifJamshed, Fundamental of Cyber Security: Principles, Theory and Practices, BPB Publications.

References:

Paul A. Watters, Cyber Security: Concepts and Cases, CreateSpace Independent Publishing Platform, 2012.

Peter W. Singer, Allan Friedman, Cybersecurity: What Everyone Needs to Know, Oxford University Press.

David Sutton, Cyber Security: A Practitioner's Guide, BCS Learning & Development Limited, 2017.

INTRUSION DETECTION SYSTEMS

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS203 | 2 | 1 | - | 3 |

MODULE-I

History of Intrusion detection, Audit, Concept and definition , Internal and external threats to data, attacks, Need and types of IDS, Information sources Host based information sources, Network based information sources.

MODULE-II

Intrusion Prevention Systems, Network IDS protocol based IDS ,HybridIDS, Analysis schemes,

thinking about intrusion. A model for intrusion analysis , techniques Responses requirement of responses, types of responses mapping responses to policy Vulnerability analysis, credential analysis noncredential analysis

MODULE-III

Introduction to Snort, Snort Installation Scenarios, Installing Snort,Running Snort on Multiple Network Interfaces, Snort Command Line Options. Step-By-Step Procedure to Compile and Install Snort Location of Snort Files, Snort Modes Snort Alert Modes

MODULE-IV

Working with Snort Rules, Rule Headers, Rule Options, The Snort Configuration File etc. Plugins, Preprocessors and Output Modules,Using Snort with MySQL

MODULE-V

Using ACID and Snort Snarf with Snort, Agent development for intrusion detection, Architecture models of IDS and IPs.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

TEXT BOOKS:

1. Rafeeq Rehman : “ Intrusion Detection with SNORT, Apache,MySQL, PHP and ACID,” 1st Edition, Prentice Hall , 2003.

REFERENCES:

1. Christopher Kruegel, Fredrik Valeur, Giovanni Vigna: “Intrusion Detection and Correlation Challenges and Solutions”, 1st Edition, Springer, 2005.
2. Carl Endorf, Eugene Schultz and Jim Mellander “ Intrusion Detection & Prevention”, 1st Edition, Tata McGraw-Hill, 2004.
3. Stephen Northcutt, Judy Novak : “Network Intrusion Detection”, 3rd Edition, New Riders Publishing, 2002.
4. T. Fahringer, R. Prodan, “A Text book on Grid Application Development and Computing Environment”. 6th Edition, Khanna Publishers, 2012.

CYBER SECURITY- II LAB

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|--------------------|----------|----------|-------------|---------------------|
| MCS222 | - | - | 2 | 1 |

Experiments

1. Implementation and Configuration of Firewall Using Windows Operating System.
2. Implementation and Configuration of Firewall Using Linux Operating System.
3. Check and Test your device with online Firewall
4. Implementation of Intrusion Detection and Presentation System using any tool in Windows / Linux Operating System
5. Payment gateway Integration using any language / tool.
6. Implementation and Quantification of Security using Security Development Lifecycle through Kali Linux
7. Perform Information Security Policy Audit Using tool / checklist.
8. Evaluate Risk using Qualitative Risk Analysis tool through Kali Linux
9. Evaluate Project Schedules Using Quantitative Risk Analysis tool.

Examination Scheme:

| IA | | | | EE | |
|-----------|-----------|-----------|----------|-----------|----------|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

INTRUSION DETECTION SYSTEMS LAB

| Course Code | L | T | P | Credit |
|--------------------|----------|----------|----------|---------------|
| MCS 223 | - | - | 2 | 1 |

1. Working with Trojans, Backdoors and sniffer for monitoring network communication
2. Denial of Service and Session Hijacking using Tear Drop, DDOS attack.
3. Penetration Testing and justification of penetration testing through risk analysis
4. Password guessing and Password Cracking.
5. Wireless Network attacks , Bluetooth attacks
6. Firwalls , Intrusion Detection and Honeypots
7. Malware – Keylogger, Trojans, Keylogger countermeasures
8. Understanding Data Packet Sniffers
9. Windows Hacking – NT LAN Manager, Secure 1 password recovery
10. Implementing Web Data Extractor and Web site watcher.

Examination Scheme:

| IA | | | | EE | |
|-----------|-----------|-----------|----------|-----------|----------|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

CYBER LAWS & SECURITY POLICIES

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS231 | 2 | 1 | - | 3 |

Module I: Information Technology Law

The Information Technology Legal Framework in India, Cyber Crime, Digital Evidence, Technological Standards under the Information Technology Law, Liability of companies under the Information Technology Act, Recent amendments by the IT (Amendment Act) 2008, ActSection66(A, B, C, D, E, F),ITActSection67 (A, B, C).

Security Investigation-Legal, Ethical and Professional Issues.

Module II

Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

Module III Cyber law and related Legislation :

Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

Module IV Electronic Business and legal issues:

Evolution and development in Ecommerce, paper vs paper less contracts E-Commerce models- B2B, B2C,E security. Application area: Business, taxation, electronic payments, supplychain, EDI, E-markets, Emerging Trends.

Module V Case Study On Cyber Crimes:

Harassment Via E-Mails, Email Spoofing (Online A Method Of Sending E-Mail Using A False Name Or E-Mail Address To Make It Appear That The E-Mail Comes From Somebody Other Than The True Sender, Cyber Pornography (Exm.MMS),Cyber-Stalking.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

TEXT BOOKS :

- 1 .K.Kumar,” Cyber Laws: Intellectual property & E Commerce, Security”,1 st Edition, Dominant Publisher,2011.
2. Rodney D. Ryder, “ Guide To Cyber Laws”, Second Edition, Wadhwa And Company, New Delhi, 2007.
3. Information Security policy & implementation Issues, NIIT, PHI.

REFERENCES :

1. Vakul Sharma, "Handbook Of Cyber Laws" Macmillan India Ltd, 2 nd Edition, PHI, 2003.
2. Justice Yatindra Singh, " Cyber Laws", Universal Law Publishing, 1st Edition, New Delhi, 2003.
3. Sharma, S.R., “Dimensions Of Cyber Crime”, Annual Publications Pvt. Ltd., 1st Edition, 2004.
4. Augustine, Paul T.,” Cyber Crimes And Legal Issues”, Crecent Publishing Corporation, 2007.

SOCIAL MEDIA SECURITY

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|--------------------|----------|----------|-------------|---------------------|
| MCS232 | 2 | 1 | - | 3 |

Module I

Introduction to Online Social Networks, data collection from social networks, challenges, opportunities, and pitfalls in online social networks, APIs.

Module II

Collecting data from Online Social Media, Trust, and credibility.

Module III

Reputations in social systems, Online social Media and Policing.

Module IV

Information privacy disclosure, revelation and its effects in OSM and online social networks.

Module V

Phishing in OSM & Identifying fraudulent entities in online social networks.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|----------------------|------------|-------------------|------------|-------------|-------------|-----------|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

BIOMETRIC SECURITY

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS233 | 2 | 1 | - | 3 |

MODULE-I

Biometrics- Introduction- benefits of biometrics over traditional authentication systems – benefits of biometrics in identification systems-selecting a biometric for a system– Applications – Key biometric terms and processes - biometric matching methods – Accuracy in biometric systems.

MODULE-II

Physiological Biometric Technologies: Fingerprints – Technical description – characteristics - Competing technologies - strengths – weaknesses – deployment - Facial scan - Technical description - characteristics - weaknesses-deployment - Iris scan – Technical description – characteristics - strengths – weaknesses – deployment- Retina vascular pattern

MODULE-III

Technical description – characteristics - strengths – weaknesses – deployment - Hand scan - Technical description-characteristics -strengths – weaknesses deployment – DNA biometrics. Behavioral Biometric Technologies: Handprint Biometrics – DNA Biometrics.

MODULE-IV

signature and handwriting technology - Technical description – classification – keyboard / keystroke dynamics- Voice – data acquisition - feature extraction - characteristics - strengths – weaknesses-deployment.

MODULE-V

Multi biometrics and multi factor biometrics - two-factor authentication with passwords - tickets and tokens – executive decision - implementation plan.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

TEXT BOOKS:

1. Samir Nanavathi, Michel Thieme, and Raj Nanavathi : “Biometrics-Identity verification in a network”, 1st Edition, Wiley Eastern, 2002.
2. John Chirillo and Scott Blaul : “Implementing Biometric Security”, 1st Edition, Wiley Eastern Publication, 2005.

REFERENCES:

1. John Berger: “Biometrics for Network Security”, 1st Edition, Prentice Hall, 2004.

MATLAB

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS 234 | 2 | 1 | - | 3 |

Course Objective:

The availability of technical computing environment such as MATLAB is now reshaping the role and applications of computer laboratory projects to involve students in more intense problem-solving experience. This availability also provides an opportunity to easily conduct numerical experiments and to tackle realistic and more complicated problems.

Course Contents:

Module I: Introduction

Basic Features, Starting MAT Lab, Using MAT Lab, Quitting Mat lab, Creating MATLAB variables, Overwriting variable, Error messages, Making corrections, Managing the workspace, Keeping track of your work session, Entering multiple statements per line.

Module II: Basic Plotting

overview, Creating simple plots, Adding titles, axis labels, and annotations, Multiple data sets in one plot, Specifying line styles and colors, Matrix generation, Array operations and Linear equations, Matrix arithmetic operations, Array arithmetic operations ,Solving linear equations, Matrix inverse.

Module III: Introduction to programming in MATLAB

Introduction, M-File Scripts, Script side-effects, M-File functions, Anatomy of a M-File function, Input and output arguments, Input to a script file.

Module IV: Control Flow and operators

Introduction, Control Flow, The ``if...end" structure , Relational and logical operators , The ``for...end" loop , The ``while...end" loop, Other Flow structures , Operator precedence

Module V: Debugging M-Files

Introduction , Debugging process, Preparing for debugging , Setting breakpoints, Running with breakpoints , Examining values, Correcting and ending debugging, Ending debugging, Correcting an M-File . .

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

WIRELESS NETWORKS

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|--------------------|----------|----------|-------------|---------------------|
| MCS235 | 2 | 1 | - | 3 |

Module I:

Wireless Networks: Wireless Network, Wireless Network Architecture, Wireless Switching Technology, Wireless Communication problem, Wireless Network Reference Model, Wireless Networking Issues & Standards.

Module II:

Wireless LAN: Infrared Vs radio transmission, Infrastructure and Ad-hoc Network, IEEE 802.11: System Architecture, Protocol Architecture, 802.11b, 802.11a, Bluetooth: User Scenarios, Architecture.

Module III:

Global System for Mobile Communications (GSM): Mobile Services, System Architecture, Protocols, Localization & Calling, Handover, Security. GPRS: GPRS System, Architecture, UMTS: UMTS System Architecture. LTE: Long Term Evolution.

Module IV

Mobile Computing: Mobile communication, Mobile computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Mobility Management, Mobile Network Layer: Mobile IP: Goals, Assumptions, Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Dynamic Host Configuration Protocol (DHCP)

Module V

Implementation of wireless network through cisco packet tracer, create network topologies ,IP addressing type and subnet mask, address management , routing and switching configuration, wired and wireless network configuration, VLAN configuration, wireless router and AP configuration, Security implementation.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|----------------------|------------|-------------------|------------|-------------|-------------|-----------|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

TEXT BOOKS:

1. Schiller, J. 2008. Mobile Communications. 2nd ed. India: Pearson Education.
2. Kumar, S. and Kakkasageri, M. S. "Wireless and Mobile Networks: Concepts and Protocols", Wiley India.
3. Kamal R. 2011. "Mobile Computing", 2nd Ed. Oxford University Press.

REFERENCES:

1. Talukder, A. K., Ahmed, H. and Yavagal, R. R. 2010. Mobile Computing: Technology, Applications and Service Creation, 2nd Ed. Tata McGraw Hill.
2. Gast, M. S. "802.11 Wireless Networks: The Definitive Guide", O'Reilly Media.

MATLAB LAB

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS 244 | - | - | 2 | 1 |

Learning outcomes :

After completion of the course the student will be able to :

- 1) Understand the basics of MAT LAB.
- 2) Solve the problems under analysis like heuristic search etc.,
- 3) To Programme how to analyze the error concepts and their importance.
- 4) Apply different types of logics and their procedures for problem solving.
- 5) Solve complex problems using knowledge.
- 6) Understand what exact the Uncertainty learning is.

Course Contents:

1. Characteristics of MATLAB
2. Introduction to MATLAB
3. Understand the graphical interface to the MATLAB workspace.
4. Getting started with MATLAB by creating variables, Arithmetic operations etc.,
5. Executing the Mathematical expressions.
6. Creating simple plots.
7. Matrix Generation.
8. Array Operations and linear equation with MATLAB
9. Basic Programming with MATLAB
10. Debugging M- Files

Examination Scheme:

| IA | | | | EE | |
|----|----|----|----|----|----|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

WIRELESS NETWORKS LAB

| | | | | |
|--------------------|----------|----------|-------------|---------------------|
| COURSE CODE | L | T | P/FW | CREDIT UNITS |
| MCS245 | - | - | 2 | 1 |

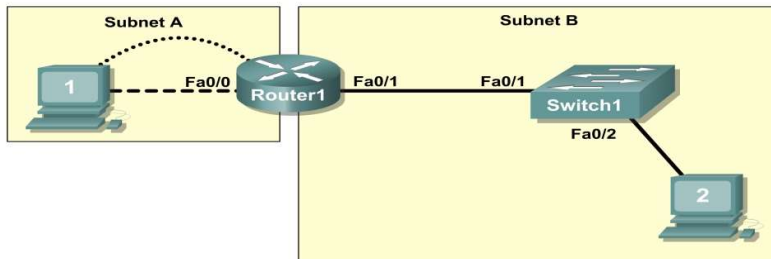
List of Experiments

Lab I: Review of Concepts from Exploration - I

- Create a logical topology given network requirements
- Create subnets to meet host requirements
- Configure the physical topology
- Configure the logical topology
- Verify network connectivity
- Configure and verify passwords

Lab II: Troubleshooting a Small Network

Topology Diagram



- Verify that a paper design meets stated network requirements
- Cable a network according to the topology diagram
- Erase the startup configuration and reload a router to the default state
- Load the routers with supplied scripts
- Discover where communication is not possible
- Gather information about the misconfigured portion of the network along with any other errors
- Analyze information to determine why communication is not possible
- Propose solutions to network errors
- Implement solutions to network errors

Examine the Logical LAN Topology

The IP address block of 172.16.30.0 /23 is subnetted to meet the following requirements:

| Subnet | Number of Hosts |
|----------|-----------------|
| Subnet A | 174 |
| Subnet B | 60 |

Additional requirements and specifications:

- The 0 subnet is used.
- The smallest possible number of subnets that satisfy the requirements for hosts should be used, keeping the largest possible block in reserve for future use.
- Assign the first usable subnet to Subnet A.
- Host computers use the first IP address in the subnet. The network router uses the last network host address.

Based on these requirements, the following topology has been provided to you:

| Subnet A | |
|-----------------------|-----------------|
| Specification | Value |
| IP mask (decimal) | 255.255.255.0 |
| IP address | 172.16.30.0 |
| First IP host address | 172.16.30.1 |
| Last IP host address | 172.16.30.254 |
| Subnet B | |
| Specification | Value |
| IP mask (decimal) | 255.255.255.128 |
| IP address | 172.16.31.0 |
| First IP host address | 172.16.31.1 |
| Last IP host address | 172.16.31.126 |

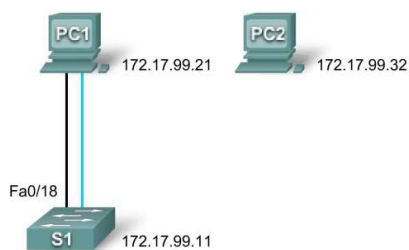
Examine each of the values in the tables above and verify that this topology meets all requirements and specifications. Are any of the given values incorrect? _____

If yes, correct the values in the table above and write the corrected values below:

Create a configuration table similar to the one below using your corrected values:

| Device | IP address | Mask | Gateway |
|---------------|---------------|-----------------|---------------|
| Host1 | 172.16.30.1 | 255.255.255.0 | 172.16.30.254 |
| Router1–Fa0/0 | 172.16.30.254 | 255.255.255.0 | N/A |
| Host2 | 172.16.31.1 | 255.255.255.128 | 172.16.31.126 |
| Router1–Fa0/1 | 172.16.31.126 | 255.255.255.128 | N/A |

Lab III: Basic Switch Configuration



Addressing Table

| Device | Interface | IP Address | Subnet Mask | Default Gateway |
|--------|-----------|--------------|---------------|-----------------|
| PC1 | NIC | 172.17.99.21 | 255.255.255.0 | 172.17.99.1 |
| PC2 | NIC | 172.17.99.32 | 255.255.255.0 | 172.17.99.1 |
| S1 | VLAN99 | 172.17.99.11 | 255.255.255.0 | 172.17.99.1 |

Learning Objectives

Cable a network according to the topology diagram

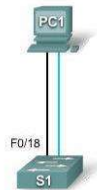
Clear an existing configuration on a switch

Examine and verify the default configuration

- Create a basic switch configuration, including a name and an IP address
- Configure passwords to ensure that access to the CLI is secured
- Configure switch port speed and duplex properties for an interface
- Configure basic switch port security
- Manage the MAC address table
- Assign static MAC addresses
- Add and move hosts on a switch

Lab IV: Managing Switch Operating System and Configuration Files

Topology Diagram



Addressing Table

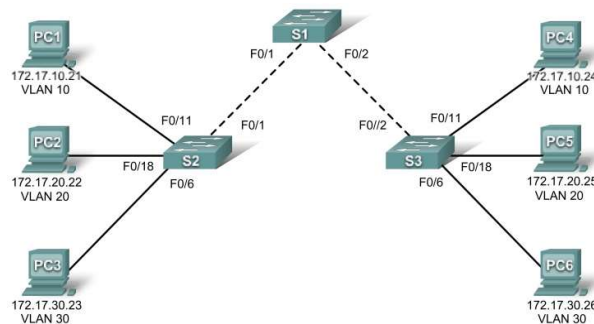
| Device | Hostname | Interface | IP Address | Subnet Mask | Default Gateway |
|--------|----------|-----------|--------------|---------------|-----------------|
| PC1 | Host-A | NIC | 172.17.99.21 | 255.255.255.0 | 172.17.99.1 |
| S1 | ALSwitch | VLAN99 | 172.17.99.11 | 255.255.255.0 | 172.17.99.1 |

Learning Objectives

- Create and save a basic switch configuration
- Set up a TFTP server on the network
- Back up the switch Cisco IOS software to a TFTP server and then restore it
- Back up the switch configuration to a TFTP server
- Configure a switch to load a configuration from a TFTP server
- Upgrade the Cisco IOS software from a TFTP server

Lab V: Basic VLAN Configuration

Topology Diagram



Addressing Table

| Device (Hostname) | Interface | IP Address | Subnet Mask | Default Gateway |
|-------------------|-----------|--------------|---------------|-----------------|
| S1 | VLAN 99 | 172.17.99.11 | 255.255.255.0 | N/A |
| S2 | VLAN 99 | 172.17.99.12 | 255.255.255.0 | N/A |
| S3 | VLAN 99 | 172.17.99.13 | 255.255.255.0 | N/A |
| PC1 | NIC | 172.17.10.21 | 255.255.255.0 | 172.17.10.1 |

| | | | | |
|------------|------------|--------------|---------------|-------------|
| PC2 | NIC | 172.17.20.22 | 255.255.255.0 | 172.17.20.1 |
| PC3 | NIC | 172.17.30.23 | 255.255.255.0 | 172.17.30.1 |
| PC4 | NIC | 172.17.10.24 | 255.255.255.0 | 172.17.10.1 |
| PC5 | NIC | 172.17.20.25 | 255.255.255.0 | 172.17.20.1 |
| PC6 | NIC | 172.17.30.26 | 255.255.255.0 | 172.17.30.1 |

Initial Port Assignments (Switches 2 and 3)

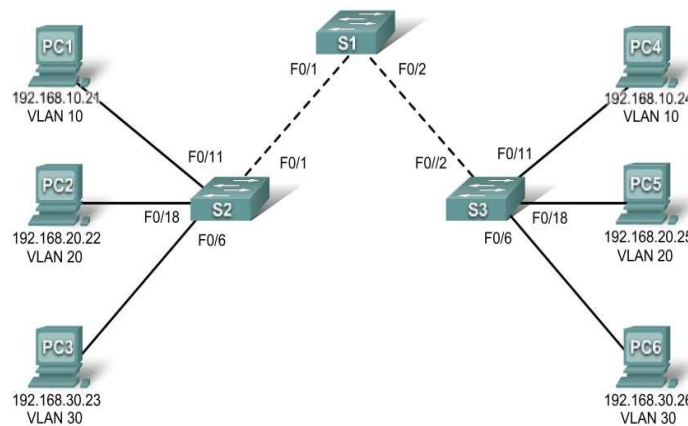
| Ports | Assignment | Network |
|---------------|--------------------------------|-----------------|
| Fa0/1 – 0/5 | 802.1q Trunks (Native VLAN 99) | 172.17.99.0 /24 |
| Fa0/6 – 0/10 | VLAN 30 – Guest (Default) | 172.17.30.0 /24 |
| Fa0/11 – 0/17 | VLAN 10 – Faculty/Staff | 172.17.10.0 /24 |
| Fa0/18 – 0/24 | VLAN 20 – Students | 172.17.20.0 /24 |

Learning Objectives

- Cable a network according to the topology diagram
- Erase the startup configuration and reload a switch to the default state
- Perform basic configuration tasks on a switch
- Create VLANs
- Assign switch ports to a VLAN
- Add, move, and change ports
- Verify VLAN configuration
- Enable trunking on inter-switch connections
- Verify trunk configuration
- Save the VLAN configuration

Lab VI: Troubleshooting VLAN Configurations

Topology Diagram



Addressing Table

| Device (Hostname) | Interface | IP Address | Subnet Mask | Default Gateway |
|-------------------|----------------|---------------|---------------|-----------------|
| S1 | VLAN 56 | 192.168.56.11 | 255.255.255.0 | N/A |

| | | | | |
|------------|----------------|---------------|---------------|--------------|
| S2 | VLAN 56 | 192.168.56.12 | 255.255.255.0 | N/A |
| S3 | VLAN 56 | 192.168.56.13 | 255.255.255.0 | N/A |
| PC1 | NIC | 192.168.10.21 | 255.255.255.0 | 192.168.10.1 |
| PC2 | NIC | 192.168.20.22 | 255.255.255.0 | 192.168.20.1 |
| PC3 | NIC | 192.168.30.23 | 255.255.255.0 | 192.168.30.1 |
| PC4 | NIC | 192.168.10.24 | 255.255.255.0 | 192.168.10.1 |
| PC5 | NIC | 192.168.20.25 | 255.255.255.0 | 192.168.20.1 |
| PC6 | NIC | 192.168.30.26 | 255.255.255.0 | 192.168.30.1 |

Initial Port Assignments (Switches 2 and 3)

| Ports | Assignment | Network |
|---------------|--------------------------------|------------------|
| Fa0/1 – 0/5 | 802.1q Trunks (Native VLAN 56) | 192.168.56.0 /24 |
| Fa0/6 – 0/10 | VLAN 30 – Guest (Default) | 192.168.30.0 /24 |
| Fa0/11 – 0/17 | VLAN 10 – Faculty/Staff | 192.168.10.0 /24 |
| Fa0/18 – 0/24 | VLAN 20 – Students | 192.168.20.0 /24 |

In this lab, you will practice troubleshooting a misconfigured VLAN environment. Load or have your instructor load the configurations below into your lab gear. Your objective is to locate and correct any and all errors in the configurations and establish end-to-end connectivity. Your final configuration should match the topology diagram and addressing table. All passwords are set to **cisco**, except the enable secret password, which is set to **class**.

Task 1: Prepare the Network

Step 1: Cable a network that is similar to the one in the topology diagram.

Step 2: Clear any existing configurations on the switches, and initialize all ports in the shutdown state.

Step 3: Import the configurations below.

Switch 1

```

hostname S1
no ip domain-lookup
enable secret class
!
!
interface range FastEthernet0/1-5
switchport mode trunk
!
interface range FastEthernet0/6-24
shutdown
!
interface Vlan1
no ip address
no ip route-cache
!
interface Vlan56
ip address 192.168.56.11 255.255.255.0
no ip route-cache
!
line con 0

```

```
logging synchronous
line vty 0 4
no login
line vty 5 15
password cisco
login
!
end
```

Switch 2

```
hostname S2
no ip domain-lookup
enable secret class
!
vlan 10,20,30,56
!
interface range FastEthernet0/1-5
switchport trunk native vlan 56
switchport mode access
!
interface range FastEthernet0/6-10
switchport access vlan 30
switchport mode access
!
interface range FastEthernet0/11-17
switchport access vlan 10
switchport mode access
!
interface range FastEthernet0/18-24
switchport access vlan 20
switchport mode access
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
ip address 192.168.56.12 255.255.255.0
no ip route-cache
shutdown
!
line con 0
password cisco
login
line vty 0 4
password cisco
login
line vty 5 15
password cisco
```

```

login
!
end

Switch 3
hostname S3
no ip domain-lookup
enable secret class
!
vlan 10,20,30
!
interface range FastEthernet0/1-5
switchport trunk native vlan 56
switchport mode trunk
!
interface range FastEthernet0/6-10
switchport mode access
!
interface range FastEthernet0/11-17
switchport mode access
!
interface range FastEthernet0/18-24
switchport mode access
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
no ip route-cache
shutdown
!
interface Vlan56
no ip route-cache
!
line con 0
password cisco
login
line vty 0 4
password cisco
login
line vty 5 15
password cisco
login
!
End

```


Task 2: Troubleshoot and Repair the VLAN Configuration

Task 3: Document the Switch Configurations

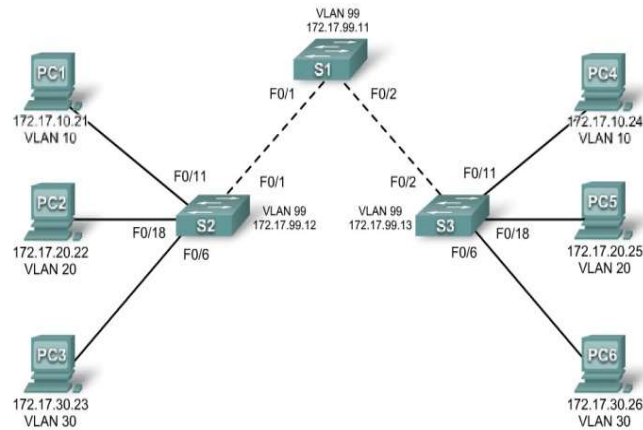
On each switch, capture the running configuration to a text file and save for future reference:

Task 4: Clean Up

Erase the configurations and reload the switches. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

Lab VII: Basic VTP Configuration

Topology Diagram



Addressing Table

| Device (Hostname) | Interface | IP Address | Subnet Mask | Default Gateway |
|----------------------|-----------|--------------|---------------|-----------------|
| S1 | VLAN 99 | 172.17.99.11 | 255.255.255.0 | N/A |
| S2 | VLAN 99 | 172.17.99.12 | 255.255.255.0 | N/A |
| S3 | VLAN 99 | 172.17.99.13 | 255.255.255.0 | N/A |
| PC1 | NIC | 172.17.10.21 | 255.255.255.0 | 172.17.10.1 |
| PC2 | NIC | 172.17.20.22 | 255.255.255.0 | 172.17.20.1 |
| PC3 | NIC | 172.17.30.23 | 255.255.255.0 | 172.17.30.1 |
| PC4 | NIC | 172.17.10.24 | 255.255.255.0 | 172.17.10.1 |
| PC5 | NIC | 172.17.20.25 | 255.255.255.0 | 172.17.20.1 |
| PC6 | NIC | 172.17.30.26 | 255.255.255.0 | 172.17.30.1 |

Port Assignments (Switches 2 and 3)

| Ports | Assignment | Network |
|-------------|--------------------------------|-----------------|
| Fa0/1 – 0/5 | 802.1q Trunks (Native VLAN 99) | 172.17.99.0 /24 |

| | | |
|---------------|---------------------------|-----------------|
| Fa0/6 – 0/10 | VLAN 30 – Guest (Default) | 172.17.30.0 /24 |
| Fa0/11 – 0/17 | VLAN 10 – Faculty/Staff | 172.17.10.0 /24 |
| Fa0/18 – 0/24 | VLAN 20 – Students | 172.17.20.0 /24 |

Learning Objectives

Cable a network according to the topology diagram

Erase the startup configuration and reload a switch to the default state

Perform basic configuration tasks on a switch

Configure VLAN Trunking Protocol (VTP) on all switches

Enable trunking on inter-switch connections

Verify trunk configuration

Modify VTP modes and observe the impact

Create VLANs on the VTP server, and distribute this VLAN information to switches in the network

Explain the differences in operation between VTP transparent mode, server mode, and client mode

Assign switch ports to the VLANs

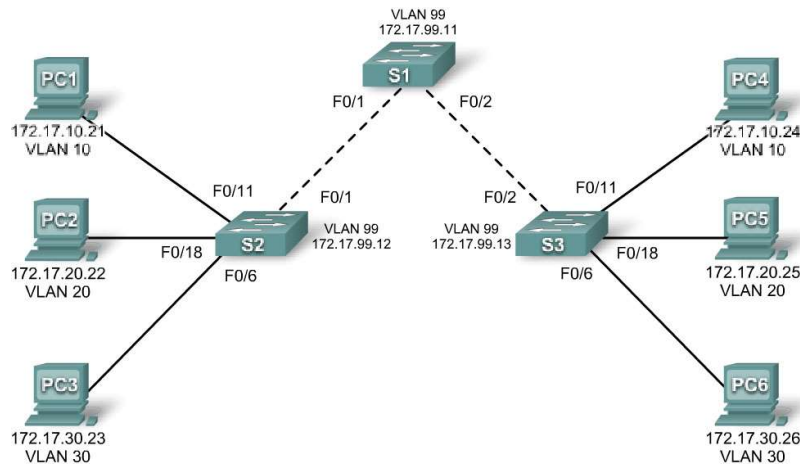
Save the VLAN configuration

Enable VTP pruning on the network

Explain how pruning reduces unnecessary broadcast traffic on the LAN

Lab VIII: Troubleshooting VTP Configuration

Topology Diagram



Addressing Table

| Device (Hostname) | Interface | IP Address | Subnet Mask |
|------------------------------|------------------|-------------------|--------------------|
| S1 | VLAN 99 | 172.17.99.11 | 255.255.255.0 |
| S2 | VLAN 99 | 172.17.99.12 | 255.255.255.0 |
| S3 | VLAN 99 | 172.17.99.13 | 255.255.255.0 |
| PC1 | NIC | 172.17.10.21 | 255.255.255.0 |
| PC2 | NIC | 172.17.20.22 | 255.255.255.0 |

| | | | |
|------------|------------|--------------|---------------|
| PC3 | NIC | 172.17.30.23 | 255.255.255.0 |
| PC4 | NIC | 172.17.10.24 | 255.255.255.0 |
| PC5 | NIC | 172.17.20.25 | 255.255.255.0 |
| PC6 | NIC | 172.17.30.26 | 255.255.255.0 |

Port Assignments (Switches 2 and 3)

| Ports | Assignment | Network |
|---------------|--------------------------------|-----------------|
| Fa0/1 – 0/5 | 802.1q Trunks (Native VLAN 99) | 172.17.99.0 /24 |
| Fa0/6 – 0/10 | VLAN 30 – Guest (Default) | 172.17.30.0 /24 |
| Fa0/11 – 0/17 | VLAN 10 – Faculty/Staff | 172.17.10.0 /24 |
| Fa0/18 – 0/24 | VLAN 20 – Students | 172.17.20.0 /24 |

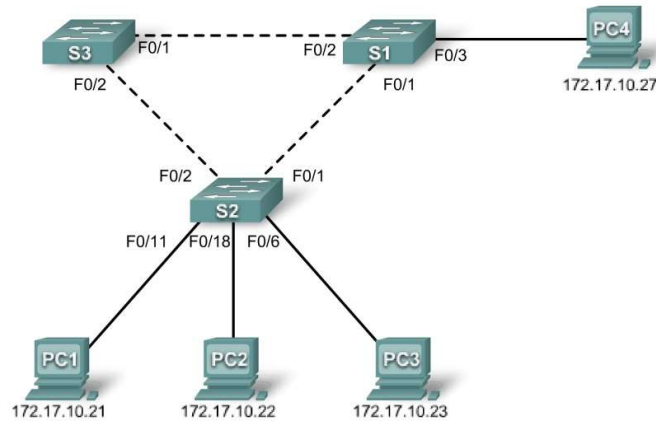
Objectives

Upon completion of this lab, you will be able to:

- Cable a network according to the topology diagram
- Erase the startup configuration and vlan.dat files and reload switches to the default state
- Load the switches with supplied scripts
- Find and correct all configuration errors
- Document the corrected network

Lab IX: Basic Spanning Tree Protocol

Topology Diagram



Addressing Table

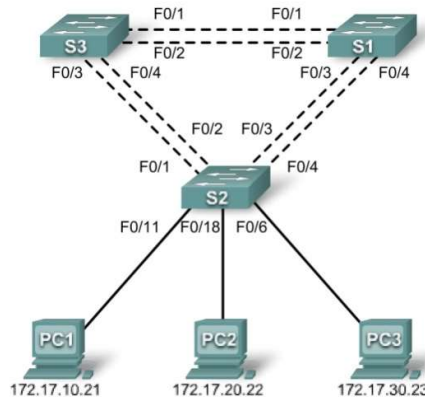
| Device (Hostname) | Interface | IP Address | Subnet Mask | Default Gateway |
|-------------------|---------------|--------------|---------------|-----------------|
| S1 | VLAN 1 | 172.17.10.1 | 255.255.255.0 | N/A |
| S2 | VLAN 1 | 172.17.10.2 | 255.255.255.0 | N/A |
| S3 | VLAN 1 | 172.17.10.3 | 255.255.255.0 | N/A |
| PC1 | NIC | 172.17.10.21 | 255.255.255.0 | 172.17.10.254 |
| PC2 | NIC | 172.17.10.22 | 255.255.255.0 | 172.17.10.254 |
| PC3 | NIC | 172.17.10.23 | 255.255.255.0 | 172.17.10.254 |
| PC4 | NIC | 172.17.10.27 | 255.255.255.0 | 172.17.10.254 |

Learning Objectives

- Cable a network according to the topology diagram
- Erase the startup configuration and reload the default configuration, setting a switch to the default state
- Perform basic configuration tasks on a switch
- Observe and explain the default behavior of Spanning Tree Protocol (STP, 802.1D)
- Observe the response to a change in the spanning tree topology

Lab X: Troubleshooting Spanning Tree Protocol

Topology Diagram



Addressing Table

| Device (Hostname) | Interface | IP Address | Subnet Mask | Default Gateway |
|-------------------|-----------|--------------|---------------|-----------------|
| S1 | VLAN 99 | 172.17.99.11 | 255.255.255.0 | N/A |
| S2 | VLAN 99 | 172.17.99.12 | 255.255.255.0 | N/A |
| S3 | VLAN 99 | 172.17.99.13 | 255.255.255.0 | N/A |
| PC1 | NIC | 172.17.10.21 | 255.255.255.0 | 172.17.10.1 |
| PC2 | NIC | 172.17.20.22 | 255.255.255.0 | 172.17.20.1 |
| PC3 | NIC | 172.17.30.23 | 255.255.255.0 | 172.17.30.1 |

Port Assignments – Switch 2

| Ports | Assignment | Network |
|---------------|--------------------------------|-----------------|
| Fa0/1 – 0/4 | 802.1q Trunks (Native VLAN 99) | 172.17.99.0 /24 |
| Fa0/5 – 0/10 | VLAN 30 – Guest (Default) | 172.17.30.0 /24 |
| Fa0/11 – 0/17 | VLAN 10 – Faculty/Staff | 172.17.10.0 /24 |
| Fa0/18 – 0/24 | VLAN 20 – Students | 172.17.20.0 /24 |

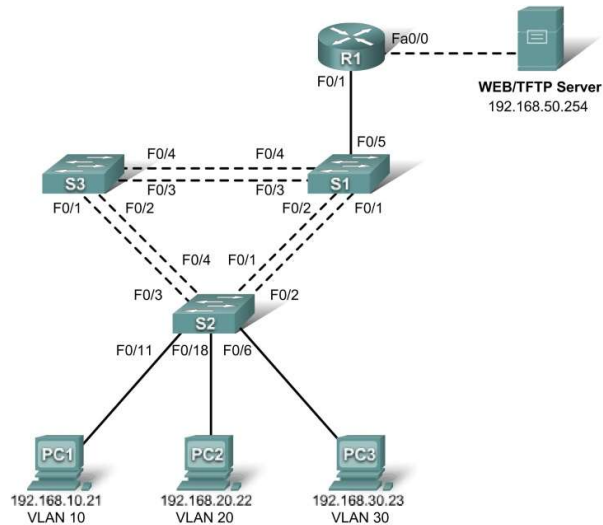
Learning Objectives

- Analyze a congestion problem in a redundant, switched LAN network.
- Recognize the capabilities for per-VLAN load balancing with PVST.
- Modify the default STP configuration to optimize available bandwidth.
- Verify that modifications have had the intended effect.

You are responsible for the operation of the redundant switched LAN shown in the topology diagram. You and your users have been observing increased latency during peak usage times, and your analysis points to congested trunks. You recognize that of the six trunks configured, only two are forwarding packets in the default STP configuration currently running. The solution to this problem requires more effective use of the available trunks. The PVST+ feature of Cisco switches provides the required flexibility to distribute the inter-switch traffic using all six trunks.

This lab is complete when all wired trunks are carrying traffic, and all three switches are participating in per-VLAN load balancing for the three user VLANs.

Lab XI: Inter-VLAN Routing *Topology Diagram*



Addressing Table

| Device (Hostname) | Interface | IP Address | Subnet Mask | Default Gateway |
|------------------------------|------------------|--------------------------------------|--------------------|------------------------|
| S1 | VLAN 99 | 192.168.99.11 | 255.255.255.0 | 192.168.99.1 |
| S2 | VLAN 99 | 192.168.99.12 | 255.255.255.0 | 192.168.99.1 |
| S3 | VLAN 99 | 192.168.99.13 | 255.255.255.0 | 192.168.99.1 |
| R1 | Fa 0/0 | 192.168.50.1 | 255.255.255.0 | N/A |
| R1 | Fa 0/1 | See Subinterface Configuration Table | | N/A |
| PC1 | NIC | 192.168.10.21 | 255.255.255.0 | 192.168.10.1 |
| PC2 | NIC | 192.168.20.22 | 255.255.255.0 | 192.168.20.1 |
| PC3 | NIC | 192.168.30.23 | 255.255.255.0 | 192.168.30.1 |
| Server | NIC | 192.168.50.254 | 255.255.255.0 | 192.168.50.1 |

Port Assignments – Switch 2

| Ports | Assignment | Network |
|---------------|--------------------------------|------------------|
| Fa0/1 – 0/5 | 802.1q Trunks (Native VLAN 99) | 192.168.99.0 /24 |
| Fa0/6 – 0/10 | VLAN 30 – Sales | 192.168.30.0 /24 |
| Fa0/11 – 0/17 | VLAN 10 – R&D | 192.168.10.0 /24 |
| Fa0/18 – 0/24 | VLAN 20 – Engineering | 192.168.20.0 /24 |

Subinterface Configuration Table – Router 1

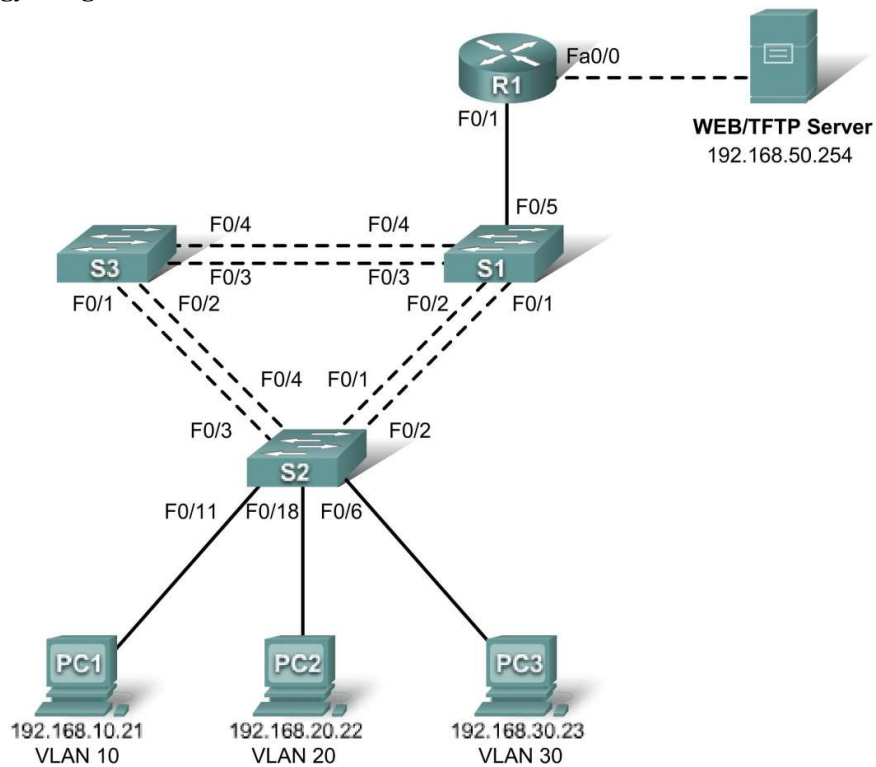
| Router Interface | Assignment | IP Address |
|-------------------------|-------------------|-------------------|
| Fa0/1.1 | VLAN1 | 192.168.1.1 |
| Fa0/1.10 | VLAN 10 | 192.168.10.1 |
| Fa0/1.20 | VLAN 20 | 192.168.20.1 |
| Fa0/1.30 | VLAN 30 | 192.168.30.1 |
| Fa0/1.99 | VLAN 99 | 192.168.99.1 |

Learning Objectives

Upon completion of this lab, you will be able to to:

- Cable a network according to the topology diagram
- Clear configurations and reload a switch and a router to the default state
- Perform basic configuration tasks on a switched LAN and a router
- Configure VLANs and VLAN Trunking Protocol (VTP) on all switches
- Configure a router to support 802.1q trunking on a Fast Ethernet interface
- Configure a router with subinterfaces corresponding to the configured VLANs
- Demonstrate inter-VLAN routing

Lab XII: Troubleshooting Inter-VLAN Routing
Topology Diagram



Addressing Table

| Device (Hostname) | Interface | IP Address | Subnet Mask | Default Gateway |
|-------------------|-----------|--------------------------------------|---------------|-----------------|
| S1 | VLAN 99 | 192.168.99.11 | 255.255.255.0 | 192.168.99.1 |
| S2 | VLAN 99 | 192.168.99.12 | 255.255.255.0 | 192.168.99.1 |
| S3 | VLAN 99 | 192.168.99.13 | 255.255.255.0 | 192.168.99.1 |
| R1 | Fa 0/0 | 192.168.50.1 | 255.255.255.0 | N/A |
| R1 | Fa 0/1 | See Subinterface Configuration Table | | N/A |
| PC1 | NIC | 192.168.10.21 | 255.255.255.0 | 192.168.10.1 |
| PC2 | NIC | 192.168.20.22 | 255.255.255.0 | 192.168.20.1 |
| PC3 | NIC | 192.168.30.23 | 255.255.255.0 | 192.168.30.1 |
| Server | NIC | 192.168.50.254 | 255.255.255.0 | 192.168.50.1 |

Port Assignments – Switch 2

| Ports | Assignment | Network |
|---------------|--------------------------------|------------------|
| Fa0/1 – 0/5 | 802.1q Trunks (Native VLAN 99) | 192.168.99.0 /24 |
| Fa0/6 – 0/10 | VLAN 30 – Sales | 192.168.30.0 /24 |
| Fa0/11 – 0/17 | VLAN 10 – R&D | 192.168.10.0 /24 |
| Fa0/18 – 0/24 | VLAN 20 – Engineering | 192.168.20.0 /24 |

Subinterface Configuration Table – Router 1

| Router Interface | Assignment | IP Address |
|------------------|------------|--------------|
| Fa0/1.1 | VLAN1 | 192.168.1.1 |
| Fa0/1.10 | VLAN 10 | 192.168.10.1 |
| Fa0/1.20 | VLAN 20 | 192.168.20.1 |
| Fa0/1.30 | VLAN 30 | 192.168.30.1 |

| | | |
|----------|---------|--------------|
| Fa0/1.99 | VLAN 99 | 192.168.99.1 |
|----------|---------|--------------|

Learning Objectives

To complete this lab:

- Cable a network according to the topology diagram
- Erase any existing configurations and reload switches and the router to the default state
- Load the switches and the router with supplied scripts
- Find and correct all configuration errors
- Document the corrected network

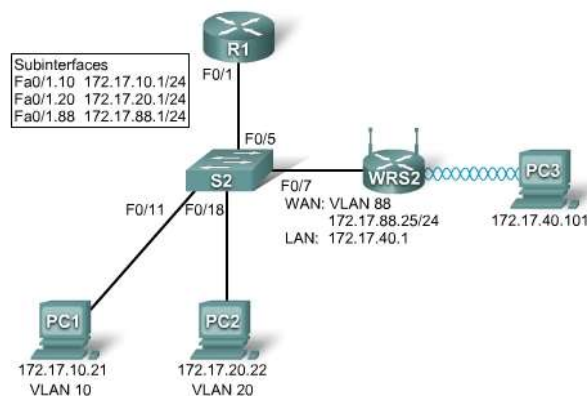
Scenario

The network has been designed and configured to support five VLANs and a separate server network. Inter-VLAN routing is being provided by an external router in a router-on-a-stick configuration, and the server network is routed across a separate Fast Ethernet interface. However, it is not working as designed, and complaints from your users have not given much insight into the source of the problems. You must first define what is not working as expected, and then analyze the existing configurations to determine and correct the source of the problems.

This lab is complete when you can demonstrate IP connectivity between each of the user VLANs and the external server network, and between the switch management VLAN and the server network.

Lab XIII: Basic Wireless Configuration

Topology Diagram

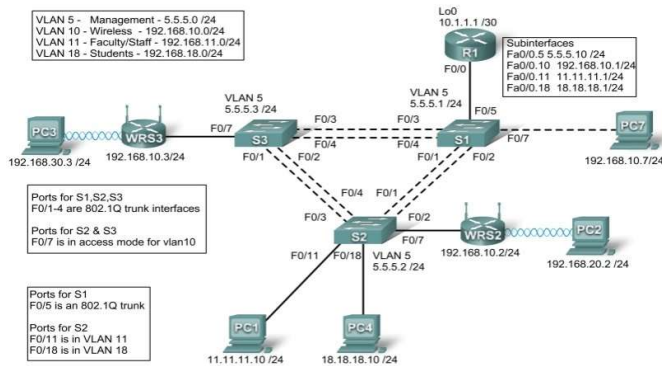


Learning Objectives

- Configure options in the Linksys Setup tab.
- Configure options in the Linksys Wireless tab.
- Configure options in the Linksys Administration tab.
- Configure options in the Linksys Security tab.
- Add wireless connectivity to a PC.
- Test connectivity.

Lab XIV: Troubleshooting Wireless Configuration

Topology Diagram



Addressing Table

| Device | Interface | IP Address | Subnet Mask | Default Gateway |
|--------|--------------|--------------|-----------------|-----------------|
| R1 | Fa0/0.5 | 5.5.5.10 | 255.255.255.0 | N/A |
| | Fa0/0.10 | 192.168.10.1 | 255.255.255.0 | N/A |
| | Fa0/0.11 | 11.11.11.1 | 255.255.255.0 | N/A |
| | Fa0/0.18 | 18.18.18.1 | 255.255.255.0 | N/A |
| | Lo0 | 10.1.1.1 | 255.255.255.252 | N/A |
| WRS2 | WAN | 192.168.10.2 | 255.255.255.0 | 192.168.10.1 |
| | LAN/Wireless | 192.168.20.1 | 255.255.255.0 | N/A |
| WRS3 | WAN | 192.168.10.3 | 255.255.255.0 | 192.168.10.1 |
| | LAN/Wireless | 192.168.30.1 | 255.255.255.0 | N/A |
| PC1 | NIC | 11.11.11.10 | 255.255.255.0 | 11.11.11.1 |
| PC4 | NIC | 18.18.18.10 | 255.255.255.0 | 18.18.18.1 |
| S1 | VLAN 5 | 5.5.5.1 | 255.255.255.0 | N/A |
| S2 | VLAN 5 | 5.5.5.2 | 255.255.255.0 | N/A |
| S3 | VLAN 5 | 5.5.5.3 | 255.255.255.0 | N/A |

Scenario

In this lab, a basic network and wireless network have been configured improperly. You must find and correct the misconfigurations based on the minimum network specifications provided by your company.

Here are the configurations to load into your router and switches.

R1 Configuration

```
hostname R1
!
interface Loopback0
ip address 10.1.1.1 255.255.255.0
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
no shutdown
!
```

```

interface FastEthernet0/0.5
 encapsulation dot1Q 5
 ip address 5.5.5.10 255.255.255.0
!
interface FastEthernet0/0.10
 encapsulation dot1Q 10
 ip address 192.168.11.1 255.255.255.0
!
!
interface FastEthernet0/0.18
 encapsulation dot1Q 18
 ip address 18.18.18.1 255.255.255.0
!
ip route 192.168.20.0 255.255.255.0 192.168.10.2
ip route 192.168.30.0 255.255.255.0 192.168.10.3
!
line con 0
 exec-timeout 0 0
 logging synchronous
!
end

```

Switch 1 Configuration

```

hostname S1
!
vtp mode transparent
!
vlan 5,10-11
!
interface FastEthernet0/1
 switchport trunk allowed vlan 5,10,11
 switchport mode trunk
 switchport trunk native vlan 5
!
interface FastEthernet0/2
 switchport trunk allowed vlan 5,10,11
 switchport mode trunk
 switchport trunk native vlan 5
!
interface FastEthernet0/3
 switchport trunk allowed vlan 5,10,11
 switchport mode trunk
 switchport trunk native vlan 5
!
interface FastEthernet0/4
 switchport trunk allowed vlan 5,10,11
 switchport mode trunk
 switchport trunk native vlan 5

```

```
!  
interface FastEthernet0/5  
  switchport mode trunk  
  switchport trunk native vlan 5  
!  
interface Vlan5  
  ip address 5.5.5.1 255.255.255.0  
  no shutdown  
!  
line con 0  
  exec-timeout 0 0  
  logging synchronous  
!  
End
```

Switch 2 Configuration

```
hostname S2  
!  
vtp mode transparent  
ip subnet-zero  
!  
vlan 5,10-11,18  
!  
interface FastEthernet0/1  
  switchport trunk allowed vlan 5,10,11,18  
  switchport mode access  
!  
interface FastEthernet0/2  
  switchport trunk allowed vlan 5,10,11,18  
  switchport mode access  
!  
interface FastEthernet0/3  
  switchport trunk allowed vlan 5,10,11,18  
  switchport mode access  
!  
interface FastEthernet0/4  
  switchport trunk allowed vlan 5,10,11,18  
  switchport mode access  
!  
interface FastEthernet0/7  
  switchport access vlan 10  
!  
interface FastEthernet0/11  
  switchport access vlan 11  
  switchport mode access  
  switchport port-security mac-address sticky  
  switchport port-security mac-address sticky 0336.5b1e.33fa  
!
```

```
interface FastEthernet0/18
  switchport access vlan 18
  switchport mode access
  switchport port-security
  switchport port-security mac-address sticky
  switchport port-security mac-address sticky 022c.ab13.22fb
!
interface Vlan1
  no ip address
  shutdown
!
interface Vlan5
  ip address 5.5.5.2 255.255.255.0
  no shutdown
!
line con 0
  exec-timeout 0 0
  logging synchronous
!
End
```

Switch 3 Configuration

```
hostname S3
!
vtp mode transparent
!
vlan 5,10-11,18
!
interface FastEthernet0/1
  switchport trunk allowed vlan 5,10,11,18
  switchport mode trunk
  switchport trunk native vlan 5
!
interface FastEthernet0/2
  switchport trunk allowed vlan 5,10,11,18
  switchport mode trunk
  switchport trunk native vlan 5
!
interface FastEthernet0/3
  switchport trunk allowed vlan 5,10,11,18
  switchport mode trunk
  switchport trunk native vlan 5
!
interface FastEthernet0/4
  switchport trunk allowed vlan 5,10,11,18
  switchport mode trunk
  switchport trunk native vlan 5
!
```

```

interface FastEthernet0/7
!
interface Vlan1
no ip address
no ip route-cache
!
interface Vlan5
ip address 6.6.6.3 255.255.255.0
no shutdown
!
line con 0
exec-timeout 0 0
logging synchronous
!
end

```

Wireless Router Network Requirements

While troubleshooting WRS2 and WRS3, ensure that at least the following capabilities exist:

1. Connections via the IP addresses shown in the topology diagram.
2. More than 30 clients can get an IP address through DHCP at a single time.
3. A client can have a DHCP address for at least 2 hours.
4. Clients using both B and G wireless network modes can connect, but N clients cannot.
5. Wireless clients must be authenticated using WEP with a key of 5655545251.
6. Traffic between PC2 and PC3 must take the most efficient route possible.
7. Ping requests coming from outside WAN ports of the Linksys routers to their inside LAN/wireless IP addresses (192.168.30.1) must be successful.
8. DHCP must not give out IP addresses in a range that includes the addresses for PC2 and PC3.
9. The two wireless networks must not interfere with each other.

Examination Scheme:

| IA | | | | EE | |
|----|----|----|----|----|----|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MINOR PROJECT

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS250 | - | - | - | 6 |

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge, which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Contents

Acknowledgement

Student Certificate

Company Profile

Introduction

Chapters

Appendices

References / Bibliography

➤ **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

➤ **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

➤ **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

➤ **Student Certificate**

Given by the Institute.

➤ **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

➤ **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

➤ **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the project, the problem being solved, the importance, other related works and literature survey.

The other chapters would form the body of the report. The last chapter should be concluding in nature and should also discuss the future prospect of the project.

➤ **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➤ **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following **assessment objectives**:

1. Writing a critical literature review
 - Search for literature
 - Summarizing and presenting the literature
 - Evaluating key content and theories
2. Collecting and analyzing research material
 - Choosing and designing research method
 - Conducting the research
 - Analyzing, sorting and classifying the data to make decision
3. Interpreting research method and draw conclusion
 - Findings
 - Recommendation
4. Assigning the theories and writing the project report
 - Structuring the project in accordance with the given style
5. Bibliography
 - This refer to the books, Journals and other documents consulting while working on the project

Examination Scheme:

| Components | MRP | V | S | FP | R |
|----------------------|------------|----------|----------|-----------|----------|
| Weightage (%) | 20 | 20 | 20 | 20 | 20 |

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report

COMMUNICATION SKILLS-II

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| BCS 211 | 1 | - | - | 1 |

Course Objective:

To enrich the understanding of English language and communication, structure, style, usage, and vocabulary for global business purposes.

Course Contents:

Module I: Fundamentals of Communication

Role and purpose of communication: *7 C's of communication*

Barriers to effective communication

Enhancing listening

Forms of Communication: one-to-one, informal and formal

Module II: Verbal Communication (Written)

Business Letter

Social correspondence

Writing resume and Job applications

Module III: Speaking skills

Conversational English

Guidelines to give an effective presentation

Activities to include:

Presentations by students

Just a minute

Examination Scheme:

| Components | CT1 | CT2 | CAF | V | GD | GP | A |
|---------------|-----|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 25 | 10 | 10 | 10 | 5 |

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Textbook of Business Communication, Ramaswami S, Macmillan
- Speaking Personally, Porter-Ladousse, Cambridge

BEHAVIOURAL SCIENCE-II
(Behavioural Communication and Relationship Management)

| 1 | L | T | P/FW | CREDITS |
|----------------|----------|---|------|----------|
| BSS 211 | 1 | - | - | 1 |

Course Objective:

This course aims at imparting an understanding of:

Process of Behavioural communication

Aspects of interpersonal communication and relationship

Management of individual differences as important dimension of IPR

Course Contents:

Module I: Behavioural Communication

Scope of Behavioural Communication

Process – Personal, Impersonal and Interpersonal Communication

Guidelines for developing Human Communication skills

Relevance of Behavioural Communication in relationship management

Module II: Managing Individual Differences in Relationships

Principles

Types of issues

Approaches

Understanding and importance of self disclosure

Guidelines for effective communication during conflicts

Module III: Communication Climate: Foundation of Interpersonal Relationships

Elements of satisfying relationships

Conforming and Disconforming Communication

Culturally Relevant Communication

Guideline for Creating and Sustaining Healthy Climate

Module IV: Interpersonal Communication

Imperatives for Interpersonal Communication

Models – Linear, Interaction and Transaction

Patterns – Complementary, Symmetrical and Parallel

Types – Self and Other Oriented

Steps to improve Interpersonal Communication

Module V: Interpersonal Relationship Development

Relationship circle – Peer/ Colleague, Superior and Subordinate

Initiating and establishing IPR

Escalating, maintaining and terminating IPR

Direct and indirect strategies of terminating relationship

Model of ending relationship

Module VI: End-of-Semester Appraisal

Viva based on personal journal

Assessment of Behavioural change as a result of training

Exit Level Rating by Self and Observer

Examination Scheme:

| Components | SAP | A | Mid Term Test (CT) | VIVA | Journal for Success (JOS) |
|----------------------|-----|----|--------------------|------|---------------------------|
| Weightage (%) | 20 | 05 | 20 | 30 | 25 |

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Harvard Business School, Effective Communication: United States of America

- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLT 211 | 2 | - | - | 2 |

Course Objective:

- To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
- To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5, 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: Unité 3: Organiser son temps

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour ...
 - i) prendre un rendez-vous/ accepter et confirmer/ annuler
 - ii) inviter/accepter/refuser
3. Faire un programme d'activités
imaginer une conversation téléphonique/un dialogue
Propositions- interroger, répondre

Unité 4: Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

- Contenu grammatical:**
1. Adjectifs démonstratifs
 2. Adjectifs possessifs/exprimer la possession à l'aide de:
 - i. « de »
 - ii. A+nom/pronom disjoint
 3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
 4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut... »/ «il ne faut pas... »
 5. passé composé
 6. Questions directes/indirectes

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|---------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN

| CODE | L | T | P/FW | CREDITS |
|----------------|----------|---|------|----------|
| FLG 211 | 2 | - | - | 2 |

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods

Time and times of the day.

Weekdays, months, seasons.

Adverbs of time and time related prepositions

Module II: Irregular verbs

Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs

To comprehend the change in meaning that the verbs undergo when used as such

Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension

Reading and deciphering railway schedules/school time table

Usage of separable verbs in the above context

Module V: Accusative case

Accusative case with the relevant articles

Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns

Nominative and accusative in comparison

Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions

Accusative prepositions with their use

Both theoretical and figurative use

Module VIII: Dialogues

Dialogue reading: ‘In the market place’

‘At the Hotel’

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|----------------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLS 211 | 2 | - | - | 2 |

Course Objective:

To enable students acquire more vocabulary, grammar, verbal phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I

Revision of earlier modules.

Module II

Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III

More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs (*bueno/malo, muy, mucho, bastante, poco*).

Simple texts based on grammar and vocabulary done in earlier modules.

Module IV

Possessive pronouns

Module V

Writing/speaking essays like my friend, my house, my school/institution, myself....descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|---------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLC 211 | 2 | - | - | 2 |

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, “ma” with a third tone, it mean horse and “ma” with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills

Practice reading aloud

Observe Picture and answer the question.

Tone practice.

Practice using the language both by speaking and by taking notes.

Introduction of basic sentence patterns.

Measure words.

Glad to meet you.

Module II

Where do you live?

Learning different colors.

Tones of “bu”

Buying things and how muchit costs?

Dialogue on change of Money.

More sentence patterns on Days and Weekdays.

How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end etc.

Morning, Afternoon, Evening, Night.

Module III

Use of words of location like-li, wais hang, xia

Furniture – table, chair, bed, bookshelf,.. etc.

Description of room, house or hostel room.. eg what is placed where and how many things are there in it?

Review Lessons – Preview Lessons.

Expression ‘yao’, ‘xiang’ and ‘yaoshi’ (if).

Days of week, months in a year etc.

I am learning Chinese. Is Chinese difficult?

Module IV

Counting from 1-1000
 Use of “chang-chang”.
 Making an Inquiry – What time is it now? Where is the Post Office?
 Days of the week. Months in a year.
 Use of Preposition – “zai”, “gen”.
 Use of interrogative pronoun – “duoshao” and “ji”.
 “Whose”??? Sweater etc is it?
 Different Games and going out for exercise in the morning.

Module V

The verb “qu”
 Going to the library issuing a book from the library
 Going to the cinema hall, buying tickets
 Going to the post office, buying stamps
 Going to the market to buy things.. etc
 Going to the buy clothes Etc.
 Hobby. I also like swimming.
 Comprehension and answer questions based on it.

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|---------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation
 I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11

DATABASE AND APPLICATION SECURITY

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS301 | 2 | 1 | - | 3 |

Module- I:

Database security – Introduction includes threats, vulnerabilities and breaches, Basics of database design, DB security – concepts, approaches and challenges, types of access controls, Oracle VPD, Discretionary and Mandatory access control – Principles, applications and polyinstantiation

Module- II:

Database inference problem, types of inference attacks, distributed database, security levels, SQL-injection: types and advanced concepts. Security in relational data model, concurrency controls and locking, SQL extensions to security (oracle as an example), System R concepts, Context and control based access control, Hippocratic databases, Database watermarking, Database intrusion, Secure data outsourcing

Module- III:

Web application security, Basic principles and concepts, Authentication, Authorization, Browser security principles; XSS and CSRF, same origin policies, File security principles, Secure development and deployment methodologies, Web DB principles, OWASP – Top 10 - Detailed treatment, IoT security – OWASP Top 10 – Detailed treatment, Mobile device security – Introduction, attack vector and models, hardware centric security aspects, SMS / MMS vulnerabilities, software centric security aspects

Module- IV:

Mobile web browser security, Application security – Concepts, CIA Triad, Hexad, types of cyber attacks, Introduction to software development vulnerabilities, code analyzers – Static and dynamic analyzers, Security testing / Penetration testing – Principles and concepts, PT work flows and examples, blind tests, ethical hacking techniques, synthetic transactions, interface testing and fuzzing, SDLC phases and security mandates

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

TEXTBOOKS/ REFERENCES:

1. Michael Gertz and SushilJajodia, “Handbook of Database Security— Applications and Trends”, Springer, 2008.
2. Bryan and Vincent, “Web Application Security, A Beginners Guide ”, McGraw-Hill, 2011
3. BhavaniThuraisingham, “Database and Applications Security”, Integrating Information Security and Data Management, Auerbach Publications, 2005.
4. Alfred Basta, Melissa Zgola, “Database Security”, Course Technology, 2012

SECURE SOFTWARE ENGINEERING

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| MCS 302 | 2 | 1 | - | 3 |

Course Objective:

Evaluate secure software engineering problems, including the specification, design, implementation, and testing of software systems. Elicit, analyze and specify security requirements through SRS. Design and Plan software solutions to security problems using various paradigms. Model the secure software systems using Unified Modeling LanguageSec(UMLSec). Develop and apply testing strategies for Secure software applications

Course Contents:

Module I: Introduction to Data Structures

Software assurance and software security, threats to software security, sources of software insecurity, benefits of detecting software security, managing secure software development.

Module II: Searching and Sorting Techniques

Defining properties of secure software, how to influence the security properties of software, how to assert and specify desired security properties

Module III: Stacks

Secure software Architecture and Design: Software security practices for architecture and design: Architectural risk analysis, software security knowledge for Architecture and Design: security principles, security guidelines, and attack patterns, secure design through threat modeling.

Module IV: Queues

Writing secure software code: Secure coding techniques, Secure Programming: Data validation, Secure Programming: Using Cryptography Securely, Creating a Software Security Programs.

Module V: Programming with Linked Lists

Secure Coding and Testing: code analysis- source code review, coding practices, static analysis, software security testing, security testing consideration through SDLC

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:

Text:

- Ross J Anderson, Security Engineering: A Guide to Building Dependable Distributed Systems, 2nd Edition, Wiley, 2008.
- Julia H Allen, Sean J Barnum, Robert J Ellison, Gary McGraw, Nancy R Mead, Software Security Engineering: A Guide for Project Managers, Addison Wesley, 2008

References:

Howard, M. and LeBlanc, D., Writing Secure Code, 2nd Edition, Microsoft Press, 2003

ETHICAL HACKING AND DIGITAL FORENSIC TOOLS

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS303 | 2 | 1 | 0 | 3 |

Module- I:

Hacking windows – Network hacking – Web hacking – Password hacking. A study on various attacks – Input validation attacks – SQL injection attacks – Buffer overflow attacks - Privacy attacks.

Module- II:

TCP / IP – Checksums – IP Spoofing port scanning, DNS Spoofing. Dos attacks – SYN attacks, Smurf attacks, UDP flooding, DDOS – Models. Firewalls – Packet filter firewalls, Packet Inspection firewalls – Application Proxy Firewalls. Batch File Programming.

Module- III:

Fundamentals of Computer Fraud – Threat concepts – Framework for predicting inside attacks – Managing the threat – Strategic Planning Process. Architecture strategies for computer fraud prevention – Protection of Web sites – Intrusion detection system – NIDS, HIDS – Penetrating testing process – Web Services – Reducing transaction risks.

Module- IV:

Key Fraud Indicator selection process customized taxonomies – Key fraud signature selection process – Accounting Forensics – Computer Forensics – Journaling and its requirements – Standardized logging criteria – Journal risk and control matrix – Neural networks – Misuse detection and Novelty detection.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

References:

1. Kenneth C.Brancik “Insider Computer Fraud” Auerbach Publications Taylor & Francis Group, 2008.
2. AnkitFadia“ Ethical Hacking” 2nd Edition Macmillan India Ltd, 2006

ETHICAL HACKING AND DIGITAL FORENSIC TOOLS LAB

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS323 | - | - | 2 | 1 |

List of Experiments

1. Working with OWASP top 10 vulnerability.
2. Types of vulnerability and detection method.
3. VM, VP, PT tools manual and automation.
4. Creation of .bat files and insertion.
5. Introduction of automation tools i.e. qualys, ibm appscan, hp web inspect and acunetix.
6. Introduction of manual tools i.e. fiddler, burp suite.
7. Vulnerability analysis on sast and dast.
8. Infrastructure and web application vulnerability.
9. Honeypots, password guessing and cracking.
10. Exposure of ISO 27001 and HIPAA for finding vul on PHI/PII data.

Examination Scheme:

| IA | | | | EE | |
|----|----|----|----|----|----|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

ARTIFICIAL INTELLIGENCE AND NEURAL NETWORK

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS331 | 2 | 1 | - | 3 |

Course Objective:

The primary objective of this course is to provide an introduction to the basic principles, techniques, and applications of Artificial Intelligence. The emphasis of the course is on teaching the fundamentals and not on providing a mastery of specific commercially available software tools or programming environments. Upon successful completion of the course, you will have an understanding of the basic areas of artificial intelligence search, knowledge representation, learning and their applications in design and implementation of intelligent agents for a variety of tasks in analysis, design, and problem-solving. You will also be able to design and implement key components of intelligent agents of moderate complexity in Java and/or Lisp or Prolog and evaluate their performance. Graduate students are expected to develop some familiarity with current research problems and research methods in AI by working on a research or design project.

Course Contents:

Module I: Introduction

AI and its importance, AI Problem, Application area.

Module II: Problem Representations

State space representation, problem-reduction representation, production system, production system characteristics, and types of production system.

Module III: Heuristic Search Techniques

AI and search process, brute force search, depth-first search, breadth-first search, time and space complexities, heuristics search, hill climbing, best first search, A*, AO* algorithm, constraint satisfaction, and beam search.

Module IV: Knowledge Representation issues using predicate logic

Representation and mapping, knowledge representation mechanism, inheritable knowledge, Propositional logic: syntax and semantics, First Order Predicate Logic (FOPL).

Module V: Expert System

Basic understanding of Fuzzy Logic, Artificial Neural Network, Perceptron, Natural Language Processing, Pattern Recognition, Robotics, LISP and Prolog. The role of Artificial intelligence in Biotechnology. Introduction to Bio-inspired computing.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:

Text:

- Artificial Intelligence – II Edition, Elaine Rich, Kevin Knight TMH.

References:

- Foundations of Artificial Intelligence and Expert Systems, V S Janakiraman, K Sarukesi, P Gopalakrishnan, Macmillan India Ltd.
- Introduction to AI and Expert System, Dan W. Patterson, PHI.

HUMAN COMPUTER INTERACTION

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS332 | 2 | 1 | - | 3 |

Course Objective:

Human-computer interaction is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings. The goals of HCI are to produce usable and safe systems, as well as functional systems. This course provides the concepts of HCI and user interfaces, focusing on user interface design, evaluation, and technologies.

Course Contents:

Module I: Introduction

Importance of user Interface-definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface-popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user-Interface popularity, characteristics-Principles of user interface

Module II: Design process

Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions

Module III: Screen Designing

Design goals-Screen planning and purpose, organizing screen elements, ordering of screen data and content-screen navigation and flow-Visually pleasing composition-amount of information-focus and emphasis-presentation information simply and meaningfully-information retrieval on web-statistical graphics-Technological consideration in interface design

Module IV: Windows

New and Navigation schemes selection of window, selection of devices based and screen based controls. Components-text and messages, Icons and increases-Multimedia, colors, uses problems, choosing colors.

Module V: Software tools

Specification methods, interface-Building Tools. Interaction Devices-Keyboards and function keys-pointing devices-speech recognition digitization and generation-image and video displays-drivers.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|----------------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Human Computer Interaction, 3rd Edition Prentice Hall, 2004.
2. Jonathan Lazar, Juan Heidi Feng, Harry Hochheiser, Research Methods in Human Computer Interaction, Wiley, 2010.

References:

1. Ben Shneiderman and Catherine Plaisant Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition, pp. 672, ISBN 0-321-53735-1, March 2009), Reading, MA: Addison-Wesley Publishing Co.

DESIGN AND ANALYSIS OF ALGORITHM

| COURSE CODE | L | T | P/FW | CREDIT UNITS |
|-------------|---|---|------|--------------|
| MCS333 | 2 | 1 | - | 3 |

Course Objective:

The primary objective of this course is to provide the fundamentals concepts of Design & analysis of Algorithms. To provides knowledge of Time and space complexity of algorithms. This course is to including Mathematical foundations, Sorting & searching Order Statistics, Data Structures, Advanced Design & Analysis techniques such as Divide & Conquer, greedy method, graph theory & Dynamic Programming approaches.

Course Contents:

Module I: Algorithm Analysis

Introduction Algorithms Complexity measures, Best, worst and average-case complexity functions, problem complexity, quick review of basic data structures and algorithm design principles.

Module II: Sorting and searching Order statistics

Sorting by selection, insertion and bubble, Divide & Conquer Strategy, Heap Sort, Quick Sort Data Sorting in Linear time. other sorting algorithms— radix sort, merge sort, sternsons Matrix Multiplication.

Searching in static table— binary search, path lengths in binary trees and applications, optimality of binary search in worst cast and average-case Binary search trees, construction of optimal weighted binary search trees; Searching in dynamic table -randomly grown binary search trees, AVL and (a, b) trees. Hashing: Basic ingredients, analysis of hashing with chaining and with open addressing.

Module III: Advanced Design and Analysis Techniques

Dynamic programming- Elements of dynamic programming, Chain-matrix multiplication, All pair shortest path (Flayed -algorithm), Optimal Binary Search Tree.

Greedy algorithms- Elements of the greedy strategy, Huffman codes, Single-source shortest path in a directed graph, Knapsack problem.

Module IV: Graph Algorithms

Elementary graphs Algorithms, Minimum spanning Trees minimum spanning trees— Kruskal's and Prim's algorithms— Johnson's implementation of Prim's algorithm using priority queue data structures, Single source Shortest paths, All Pair Shortest Paths. *String processing*: String searching and Pattern matching, Knuth-Morris-Pratt algorithm and its analysis.

Module V : NP-completeness

Informal concepts of deterministic and nondeterministic algorithms, P and NP, NP-completeness, statement of Cook's theorem, some standard NP-complete problems, approximation algorithms.

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|----------------------|------------|-------------------|------------|-------------|-------------|-----------|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text Books:

- T. H. Cormen, C. E. Leiserson and R. L. Rivest: Introduction to Algorithms, Prentice Hall of India, New Delhi, 1998.
- E. Horowitz and S. Sahani: Fundamental of Computer Algorithms, Galgotia Pub. /Pitman, New Delhi/London, 1987/1978.

References Books:

- A. Aho, J. Hopcroft and J. Ullman; The Design and Analysis of Computer Algorithms, A. W. L, International Student Edition, Singapore, 1998
- S. Baase: Computer Algorithms: Introduction to Design and Analysis, 2nd ed., Addison- Wesley, California, 1988.
- K. Mehlhom: Data Structures and Algorithms, Vol. 1 and Vol. 2, Springer-Verlag, Berlin, 1984.
- A. Borodin and I. Munro: The Computational Complexity of Algebraic and Numeric Problems, American Elsevier, New York, 1975.
- D. E. Knuth: The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3. Vol. 1, 2nd ed., Narosa/Addison-Wesley, New Delhi/London, 1973; Vol. 2: 2nd ed., Addison-Wesley, 18 London, 1981; Vol. 3: Addison-Wesley, London, 1973.
- S. Winograd: The Arithmetic Complexity of Computation, SIAM, New York, 1980.

PRINCIPLES OF VIRTUALIZATION

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS334 | 2 | 1 | - | 3 |

Course Objective:

Virtualization is the single most effective way to reduce IT expenses while boosting efficiency and agility in organizations.

This unit explores the implementation and usage of VMWare Virtualization, its installation process and the working of Windows Server hyper V.

Course Contents:

Module I: Basics of Virtualization

Introduction to Unit, Need of Virtualization and Virtualization Technologies: Server Virtualization, Storage Virtualization, I/O Virtualization, Network Virtualization, Client Virtualization, Application virtualization, Desktop virtualization , Understanding Virtualization Uses: Studying Server Consolidation, Development and Test Environments , Helping with Disaster Recovery , Conclusion of the Unit

Module II: Deploying and Managing an Enterprise Desktop Virtualization Environment

Introduction to Unit , configure the BIOS to support hardware virtualization; - Install and configure Windows Virtual PC: installing Windows Virtual PC on various platforms (32-bit, 64-bit) - Creating and managing virtual hard disks - Configuring virtual machine resources including network resources - Preparing host machines; create, deploy, and maintain images

Module III: Deploying and Managing a Presentation Virtualization Environment I

Introduction to Unit , Prepare and manage remote applications - Configuring application sharing ; Package applications for deployment by using RemoteApp, installing and configuring the RD Session Host Role Service on the server. - Conclusion of the Unit

Module IV: Deploying and Managing a Presentation Virtualization Environment II

Access published applications: configuring Remote Desktop Web Access, configuring role-based application provisioning, configuring Remote Desktop client connections. - Configure client settings to access virtualized desktops: configuring client settings - Conclusion of the Unit

Module V: Understanding Virtualization Software

List of virtualization Software available . Vmware- introduction to Vsphere, ESXi, VCenter Server and Vsphere client. - Creating Virtual Machine.. Introduction to HYPER-V role. Create Virtual Machines. Create Hyper-v virtual networking, Use virtual Machine Snapshots. - Monitor the performance of a Hyper-v server, Citrix XENDesktop fundamentals

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:

- Virtualization with Microsoft Virtual Server 2005, Twan Grotenhuis, Rogier Dittner, Aaron Tiensivu, Ken Majors, Geoffrey Green, David Rule, Andy Jones, Matthijs ten Seldam; Syngress Publications, 2006
- Virtualization--the complete cornerstone guide to virtualization best practices, Ivanka Menken, Gerard Blokdijk, Lightning Source Incorporated, 2008

PYTHON

| Course Code | L | T | P/FW | CREDITS |
|-------------|---|---|------|---------|
| MCS335 | 2 | 1 | - | 3 |

Course Objective:

This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions—via the Python programming language. The course discusses the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques. Students will solve problems, explore real-world software development challenges, and create practical and contemporary applications.

Course Contents:

Module-I

Introduction to Python- features and basic syntax, interactive shell, editing, saving, and running a script. The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; understanding error messages; Conditions, boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short-circuit (lazy) evaluation

Module-II

Strings and text files; manipulating files and directories; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file.

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers

Module-III

Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries. Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Recursive functions.

Module-IV

Simple graphics and image processing: “turtle” module; simple 2d drawing - colors, shapes; digital images, image file formats, image processing; Simple image manipulations with 'image' module - convert to bw, greyscale, blur, etc.

Module-V

Classes and OOP: classes, objects, attributes and methods; defining classes; design with classes, data modeling; persistent storage of objects; inheritance, polymorphism, operator overloading; abstract classes; exception handling, try block

Examination Scheme:

| Components | C T | Assignment | P/V | Quiz | Attd | EE |
|---------------|-----|------------|-----|------|------|----|
| Weightage (%) | 15 | 10 | 10 | 10 | 5 | 50 |

Text & References:

Textbook: *Fundamentals of Python: First Programs* , Author: Kenneth Lambert , Publisher: Course Technology, Cengage Learning, 2012

PRINCIPLES OF VIRTUALIZATION LAB

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS344 | - | - | 2 | 1 |

List of experiments

1. Installing Vmware ESXi server – I
2. Installing Vmware ESXi server - II
3. Installing Vmware ESXi server - III
4. Installing Vmware vCenter with all the prerequisites – I
5. Installing Vmware vCenter with all the prerequisites - II
6. Creating Virtual Machines using vCenter server – I
7. Creating Virtual Machines using vCenter server - II
8. Modifying Virtual Machine settings – I
9. Modifying Virtual Machine settings - II
10. Clone a VM – I
11. Clone a VM - II
12. Clone a VM - III

Examination Scheme:

| IA | | | | EE | |
|----|----|----|----|----|----|
| A | PR | LR | V | PR | V |
| 5 | 15 | 15 | 15 | 25 | 25 |

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PYTHON LAB

| Course Code | L | T | P/FW | CREDITS |
|--------------------|----------|----------|-------------|----------------|
| MCS345 | - | - | 2 | 1 |

1. Installing Python and configuring environment.
2. To display and find the size of all data types in Python.
3. To show the use of loops
4. To work with different operators including lazy operators.
5. Working with strings operations.
6. Writing and reading to/from a file.
7. To perform operations on list.
8. To perform operations on tuple.
9. To perform operations on dictionary.
10. Working with functions including recursive ones.
11. To perform manipulation with image files.
12. To perform operations on images using turtle module.
13. To show OOP features in Python like encapsulation, inheritance etc.

MINOR PROJECT

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS 350 | - | - | - | 6 |

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge, which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Contents

Acknowledgement

Student Certificate

Company Profile

Introduction

Chapters

Appendices

References / Bibliography

➤ **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

➤ **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

➤ **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

➤ **Student Certificate**

Given by the Institute.

➤ **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

➤ **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

➤ **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the project, the problem being solved, the importance, other related works and literature survey.

The other chapters would form the body of the report. The last chapter should be concluding in nature and should also discuss the future prospect of the project.

➤ **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➤ **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following **assessment objectives**:

1. Writing a critical literature review
 - Search for literature
 - Summarizing and presenting the literature
 - Evaluating key content and theories
2. Collecting and analyzing research material
 - Choosing and designing research method
 - Conducting the research
 - Analyzing, sorting and classifying the data to make decision
3. Interpreting research method and draw conclusion
 - Findings
 - Recommendation
4. Assigning the theories and writing the project report
 - Structuring the project in accordance with the given style
5. Bibliography
 - This refer to the books, Journals and other documents consulting while working on the project

Examination Scheme:

| Components | MRP | V | S | FP | R |
|----------------------|------------|----------|----------|-----------|----------|
| Weightage (%) | 20 | 20 | 20 | 20 | 20 |

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report

REPORT ON PAPER PRESENTATION IN CONFERENCE

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS 351 | - | - | - | 1 |

Objective: Conferences / Seminars / Workshop are good and efficient way to get to know other researchers through their work and also personally. The educational aspect can expose the students to new ways of conducting the business and help them to discover how to be more productive. They provide a great opportunity to network. Collaboration is the way to approach networking.

Rules and Regulations

- 2nd Year / 3rd Year Students for which the students and the faculty members can start preparations well in advance prior to the scheduled conference / seminar / workshop.
- The number of students going for any conference / seminar / workshop should be manageable.
- A proposal for the proposed conference / seminar / workshop should be drafted and presented to the HoI reflecting the following key points:
 - Entire activity plan
 - Route Map
 - What are the objectives for the students?
 - What they need to learn, do, and prepare before the conference / seminar / workshop?
 - List of prospective students with Contact Details
 - List of Faculty Coordinators with Contact Details
- After getting approval from the HoI, a note sheet should be prepared and all necessary permission and approval from the competent authorities should be obtained.
- The attention and co-operation of all students and parents are requested to attend the conference / seminar / workshop most effectively. Signing of the letter of Indemnity Bond (Consent-cum-Undertaking) is mandatory for all the parents of students going for conference / seminar / workshop in or outside Jaipur. Duly executed Indemnity Bond should be submitted to HoI Office at least 2 days prior to the visit, without which the accompanying Staff coordinator shall not permit the student to participate in the industrial visit
- The list of students participating in conference / seminar / workshop shall be handed over to the concerned HODs, Staff coordinators.
- Students should be present in formals.
- Students should carry the College Identity Cards during their journey.
- Discipline should be maintained during the conference / seminar / workshop. Any violation will be viewed very seriously.
- A report of the conference / seminar / workshop is to be submitted in 5 days time by students / faculty coordinators once the students are back.

The report to be prepared should reflect the following:-

- What happened at the conference / seminar / workshop the students attend and how does it relate in the best way to the preparations and the learning objectives.
- How do the students will use the outcome of conference / seminar / workshop after it is over?

- What will they gain from it and how can they set up activities that transfer the experience into learning?
- Evaluation parameters for the success of the experience of conference / seminar / workshop.

The layout guidelines for the Report:

1. File should be in the following specification:

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components:

- Front Page
- Table of Content
- Acknowledgement
- Student Certificate
- Company Profile (optional)
- Introduction
- Main Body
- References / Bibliography

ASSESSMENT OF THE PAPER PRESENTATION FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Report File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student’s own work. It will also ensure regularity and meeting the delaines.

Examination Scheme:

| Components | V | S | R | FP |
|----------------------|----------|----------|----------|-----------|
| Weightage (%) | 20 | 20 | 20 | 40 |

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

SUMMER INTERNSHIP PROJECT

| Course Code | L | T | P | Credit |
|-------------|---|---|---|--------|
| MCS 352 | - | - | - | 3 |

GUIDELINES:

There are certain phases of every Intern's professional development that cannot be effectively taught in the academic environment. These facets can only be learned through direct, on-the-job experience working with successful professionals and experts in the field. The internship program can best be described as an attempt to institutionalize efforts to bridge the gap between the professional world and the academic institutions. Entire effort in internship is in terms of extending the program of education and evaluation beyond the classroom of a university or institution. The educational process in the internship course seeks out and focuses attention on many latent attributes, which do not surface in the normal classroom situations. These attributes are intellectual ability, professional judgment and decision-making ability, inter-disciplinary approach, skills for data handling, ability in written and oral presentation, sense of responsibility etc.

In order to achieve these objectives, each student will maintain a file (**Internship File**). The Internship File aims to encourage students to keep a personal record of their learning and achievement throughout the Programme. It can be used as the basis for lifelong learning and for job applications. Items can be drawn from activities completed in the course modules and from the workplace to demonstrate learning and personal development.

The File will assess the student's analytical skills and ability to present supportive evidence, whilst demonstrating understanding of their organization, its needs and their own personal contribution to the organization.

The **layout guidelines** for the Project & Seminar Report

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Content

Acknowledgement

Student Certificate

Company Profile (optional)

Introduction

Main Body

References / Bibliography

The File will include *five sections* in the order described below. The content and comprehensiveness of the main body and appendices of the report should include the following:

1. **The Title Page**--Title - An Internship Experience Report For (Your Name), name of internship organization, name of the Supervisor/Guide and his/her designation, date started and completed, and number of credits for which the report is submitted.
2. **Table of Content**--an outline of the contents by topics and subtopics with the page number and location of each section.
3. **Introduction**--short, but should include how and why you obtained the internship experience position and the relationship it has to your professional and career goals.
4. **Main Body**--should include but not be limited to daily tasks performed. Major projects contributed to, dates, hours on task, observations and feelings, meetings attended and their purposes, listing of tools and materials and their suppliers, and photographs if possible of projects, buildings and co-workers.
5. **References / Bibliography** --This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system

ASSESSMENT OF THE INTERNSHIP FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Internship File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

STUDENT ASSESSMENT RECORD (SAR)

1. **Range of Research Methods used to obtain information**
2. **Execution of Research**
3. **Data Analysis**
 - Analyse Quantitative/ Qualitative information
 - Control Quality
4. **Draw Conclusions**

Examination Scheme:

| Components | V | S | R | FP |
|----------------------|----------|----------|----------|-----------|
| Weightage (%) | 20 | 20 | 20 | 40 |

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

COMMUNICATION SKILLS-III

| CODE | L | T | P/FW | CREDITS |
|--------|---|---|------|---------|
| BCS311 | 1 | - | - | 1 |

Course Objective:

To initiate the learners with the basic mechanics of writing skills and facilitate them with the core skills required for communication in the professional world.

Course Contents:

Module I: Mechanics and Semantics of Sentences

Writing effective sentences

Style and Structure

Module II: Developing writing skills

Inter - office communication: Business Letter; E mails; Netiquette

Intra – office communication: Memos, Notices, Circulars, Minutes

Report Writing

Module III: Business Presentations

Planning, design and layout of presentation

Information Packaging

Audience analysis

Audio visual aids

Speaking with confidence

Case Studies

Examination Scheme:

| Components | CT1 | CT2 | CAF | V | GD | GP | A |
|---------------|-----|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 25 | 10 | 10 | 10 | 5 |

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.

BEHAVIOURAL SCIENCE-III (Leading Through Teams)

| CODE | L | T | P/FW | CREDITS |
|--------|---|---|------|---------|
| BSS311 | 1 | - | - | 1 |

Course Objective:

This course aims to enable students to:

Understand the concept and building of teams

Manage conflict and stress within team

Facilitate better team management and organizational effectiveness through universal human values.

Course Contents:

Module I: Teams: An Overview

Team Design Features: team vs. group

Effective Team Mission and Vision

Life Cycle of a Project Team

Rationale of a Team, Goal Analysis and Team Roles

Module II: Team & Sociometry

Patterns of Interaction in a Team

Sociometry: Method of studying attractions and repulsions in groups

Construction of sociogram for studying interpersonal relations in a Team

Module III: Team Building

Types and Development of Team Building

Stages of team growth

Team performance curve

Profiling your Team: Internal & External Dynamics

Team Strategies for organizational vision

Team communication

Module IV: Team Leadership & Conflict Management

Leadership styles in organizations

Self Authorized team leadership

Causes of team conflict

Conflict management strategies

Stress and Coping in teams

Module V: Global Teams and Universal Values

Management by values

Pragmatic spirituality in life and organization

Building global teams through universal human values

Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal

Viva based on personal journal

Assessment of Behavioural change as a result of training

Exit Level Rating by Self and Observer

Examination Scheme:

| Components | SAP | A | Mid Term Test (CT) | VIVA | Journal for Success (JOS) |
|---------------|-----|----|--------------------|------|---------------------------|
| Weightage (%) | 20 | 05 | 20 | 30 | 25 |

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002, Harcourt College Publishers
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLT 311 | 2 | - | - | 2 |

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: Unité 6: se faire plaisir

1. acheter: exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations

maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne...rien/personne/plus
4. Questions avec combien, quel...
5. expressions de la quantité
6. ne...plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|---------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLG 311 | 2 | - | - | 2 |

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs

Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)

Information about Germany in the form of presentations or “Referat”– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case

Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns

Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions

Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues

In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions

Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions

To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|----------------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLS 311 | 2 | - | - | 2 |

Course Objective:

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I

Revision of earlier semester modules

Set expressions (idiomatic expressions) with the verb *Tener, Poner, Ir....*

Weather

Module II

Introduction to *Gustar...* and all its forms. Revision of *Gustar* and usage of it

Module III

Translation of Spanish-English; English-Spanish. Practice sentences.

How to ask for directions (using *estar*)

Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV

Simple conversation with help of texts and vocabulary

En el restaurante

En el instituto

En el aeropuerto

Module V

Reflexives

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|---------------|-----|-----|----|----|----|---|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental

CHINESE

| CODE | L | T | P/FW | CREDITS |
|---------|---|---|------|---------|
| FLC 311 | 2 | - | - | 2 |

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronunciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills

Dialogue practice

Observe picture and answer the question.

Introduction of written characters.

Practice reading aloud

Practice using the language both by speaking and by taking notes.

Character writing and stroke order

Module II

Measure words

Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.

Directional words – beibian, xibian, nanbian, dongbian, zhongjian.

Our school and its different building locations.

What game do you like?

Difference between “hui” and “neng”, “keyi”.

Module III

Changing affirmative sentences to negative ones and vice versa

Human body parts.

Not feeling well words e.g.; fever, cold, stomach ache, head ache.

Use of the modal particle “le”

Making a telephone call

Use of “jiu” and “cai” (Grammar portion)

Automobiles e.g. Bus, train, boat, car, bike etc.

Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV

The ordinal number “di”

“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.

use of to enter to exit

Structural particle “de” (Compliment of degree).

Going to the Park.

Description about class schedule during a week in school.

Grammar use of “li” and “cong”.

Comprehension reading followed by questions.

Module V

Persuasion-Please don't smoke.

Please speak slowly

Praise – This pictorial is very beautiful

Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast ... etc.

Talking about studies and classmates

Use of “it doesn't matter”

Enquiring about a student, description about study method.

Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

| Components | CT1 | CT2 | C | I | V | A |
|----------------------|------------|------------|----------|----------|----------|----------|
| Weightage (%) | 20 | 20 | 20 | 20 | 15 | 5 |

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30

PROJECT WORK / INTERNSHIP/ DISSERTATION

| Course Code | L | T | P | Credit |
|----------------|---|---|---|--------|
| MCS460/461/462 | - | - | - | 25 |

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge, which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Contents

Acknowledgement

Student Certificate

Company Profile
Introduction
Chapters
Appendices
References / Bibliography

➤ **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

➤ **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

➤ **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

➤ **Student Certificate**

Given by the Institute.

➤ **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

➤ **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

➤ **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the project, the problem being solved, the importance, other related works and literature survey. The other chapters would form the body of the report. The last chapter should be concluding in nature and should also discuss the future prospect of the project.

➤ **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➤ **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following *assessment objectives*:

1. Writing a critical literature review
 - Search for literature
 - Summarizing and presenting the literature
 - Evaluating key content and theories
2. Collecting and analyzing research material
 - Choosing and designing research method
 - Conducting the research
 - Analyzing, sorting and classifying the data to make decision
3. Interpreting research method and draw conclusion
 - Findings
 - Recommendation
4. Assigning the theories and writing the project report
 - Structuring the project in accordance with the given style
5. Bibliography
 - This refer to the books, Journals and other documents consulting while working on the project

Examination Scheme:

| Components | MRP | V | S | FP | R |
|----------------------|------------|----------|----------|-----------|----------|
| Weightage (%) | 20 | 20 | 20 | 20 | 20 |

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report