4.1   GENERIC SKILLS AND ENTREPRENEURSHIP DEVELOPMENT

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RATIONALE

Generic Skills and Entrepreneurship Development is one of the courses from "Human Science" subject area. Generic skills have emerged as an important component of employability skills, which enable an individual to become and remain employable over lifetime and to lead happy and prosperous life. Entrepreneurship development aims at developing conceptual understanding for setting-up one's own business venture/enterprise. This aspect of Human Resource Development has become equally important in the era, when wage employment prospects have become meager. Both the subject areas are supplementary to each other and soft skills are required to be developed in diploma pass-outs for enhancing their employability and self confidence.

LEARNING OUTCOME

After undergoing the subject, the student will be able to:

- Explain the importance of generic skills
- Demonstrate self development
- Manage himself/herself physically, intellectually and psychologically
- Work effectively as a team member
- Manage tasks effectively
- Apply knowledge to solve problems
- Develop an entrepreneurial mindset.
- Identify entrepreneurial support system for new ventures and small businesses.
- Recognize a business opportunity.
- Prepare project report
- Demonstrate how to launch an individual's entrepreneurial career

DETAILED CONTENTS

1.   Introduction to Generic Skills   (04 hrs)

    1.1   Importance of Generic Skill Development
    1.2   Global and Local Scenario of Generic Skill Development
    1.3   Life Long Learning and associated importance of Generic Skill
        Development

2.   Managing Self   (08 hrs)

   2.1   Knowing Self for Self Development
      - Self-concept, personality, traits, multiple intelligence such as language intelligence, numerical intelligence, psychological intelligence etc.
   2.2   Managing Self - Physical
      - Personal grooming, Health, Hygiene, Time Management
   2.3   Managing Self – Intellectual development
      - Information Search: Sources of information
      - Writing Skills – Official & business correspondence, Job application covering letter and resume
      - Speaking Skills – Mock interview, Preparing for meeting, Group discussion
   2.4   Managing Self – Psychological
      - Stress, Emotions, Anxiety-concepts and significance
      - Techniques to manage stress

3.   Managing in Team   (06 hrs)

   3.1   Team - definition, team dynamics
   3.2   Team related skills- sympathy, empathy, co-operation, concern, lead and negotiate, work well with people from culturally diverse background

4   Task Management   (03 hrs)

   4.1   Task Initiation, planning, execution, close out
   4.2   Exercises/case studies on task planning towards development of skills for task management

5.   Problem Solving   (05 hrs)

   5.1   Prerequisites of problem solving- meaningful learning, ability to apply knowledge in problem solving
   5.2   Different approaches for problem solving.
   5.3   Steps followed in problem solving.
   5.4   Exercises/case studies on problem solving.

6.   Entrepreneurship   (22 hrs)

   6.1   Introduction
      - Concept/Meaning and its need
      - Qualities of an entrepreneur
      - Entrepreneurial Support System e.g., District Industry Centres (DICs), Commercial Banks, State Financial Corporations, Small Industries Service Institute (SISIs), Small Industries Development Bank of India (SIDBI), National Bank of Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State/National level.

6.2   Market Survey and Opportunity Identification (Business Planning)
- How to start a small scale industry
- Procedures for registration of small-scale industry
- Assessment of demand and supply in potential areas of growth.
- Understanding business opportunity
- Considerations in product selection

6.3   Project Report Preparation
- Preliminary Project Report
- Techno-Economic Feasibility Report
- Preparation of Detailed Project Report

INSTRUCTIONAL STRATEGY

This subject will require a blend of different teaching and learning methods beginning with lecture method. Some of the topics may be taught using question answer, assignment, case studies or seminar. In addition, expert lectures may be arranged from within the institution or from management organizations. Conceptual understanding of Entrepreneurship, inputs by teachers and outside experts will expose the students so as to facilitate in starting ones own business venture/enterprise. The teacher will discuss success stories and case studies with students, which in turn, will develop managerial qualities in the students. There may be guest lectures by successful diploma holding entrepreneurs and field visits also. The students may also be provided relevant text material and handouts.

RECOMMENDED BOOKS

1.   Soft Skills for Interpersonal Communication by S. Balasubramanian Published by Orient Black Swan, New Delhi**.**

1   Generic skill Development Manual, MSBTE, Mumbai.

2   Lifelong learning, Policy Brief (www.oecd.orf)

3   A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)

4   Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi

6.   Handbook of Small Scale Industry by PM Bhandari

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	04	05
2.	08	15
3.	06	10
4.	03	10
5.	05	10
6.	22	50
Total	**48**	**100**

4.2   DATA STRUCTURES

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RATIONALE

Data structures are the techniques of designing the basic algorithms for real-life projects. Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming. The knowledge of 'C' language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

LEARNING OUTCOME

After undergoing the subject, the students will be able to:

- Identify the problem and formulate an algorithm for it.
- Identify the various designing techniques
- Store data, process data in linked list.
- Sort the data in ascending or descending order.
- Apply various data structure techniques in an array.
- Implement trees and various traversing techniques.
- Implement various sorting algorithms and to compare them for checking efficiency.
- Identify proper data handling technique for handling data.

DETAILED CONTENTS

1.   Fundamental Notations   (10 hrs)

    1.1   Problem solving concept top down and bottom up design, structured programming
    1.2   Concept of data types, variables and constants
    1.3   Concept of pointer variables and constants

2.   Arrays   (12 hrs)

    2.1   Concept of Arrays
    2.2   Formula for calculating the location of [column] in single dimensional array
    2.3   Formula for calculating the location of [row, column] in two dimensional array
    2.4   Operations on arrays with Algorithms (searching, traversing, inserting, deleting)

3.   Linked Lists   (10 hrs)

      3.1   Introduction to linked list
      3.2   Representation of linked lists in Memory
      3.3   Operations on linked list
      3.4   Application of linked lists
      3.5   Doubly linked lists
      3.6   Operations on doubly linked lists

4.   Stacks, Queues and Recursion   (10 hrs)

      4.1   Introduction to stacks
      4.2   Representation of stacks
      4.3   Implementation of stacks
      4.4   Applications of stacks
      4.5   Introduction to queues
      4.6   Implementation of queues
      4.7   Circular Queues
      4.8   De-queues
      4.9   Recursion

5.   Trees   (10 hrs)

      5.1   Concept of Trees
      5.2   Representation of Binary tree in memory
      5.3   Traversing Binary Trees (Pre order, Post order and In order)
      5.4   Searching, inserting and deleting binary search trees

6.   Sorting and Searching   (12 hrs)

      6.1   Introduction to sorting and searching
      6.2   Search algorithm (Linear and Binary)
      6.3   Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort, Heap Sort (Min heap tree and Max heap tree)

LIST OF PRACTICALS

Write programmes in C to implement

1.   Sorting an array
2.   The addition of two matrices using functions
3.   The multiplication of two matrices
4.   Push and pop operation in stack
5.   Inserting and deleting elements in queue
6.   Inserting and deleting elements in circular queue
7.   Insertion and deletion of elements in linked list
8.   Insertion and deletion of elements in doubly linked list
9.   The Factorial of a given number using with recursion and without recursion

10.   Fibonacii series with recursion and without recursion
11.   Program for binary search tree operation
12.   The selection sort techniques
13.   The bubble sort technique
14.   The quick sort technique
15.   The merge sort technique
16.   The binary search procedures to search an element in a given list
17.   The linear search procedures to search an element in a given list

INSTRUCTIONAL STRATEGY

This subject clears all fundamentals of programming techniques. Teachers should stress on explaining all the techniques and algorithm in detail in theory sessions. The students should be asked to convert their ideas about a problem into and algorithms in theory class and them write programs for the algorithms. Finally all the programmes should be run on computers. This will help the students to have clear concepts of programming.

RECOMMENDED BOOKS

1.   Data Structure using C by Manoj Kumar Jambla, Eagle Publishing House, Jalandhar
2.   Data structures – Schaum's Outline Series – by Lipschutz, McGraw Hill Education Pvt Ltd , New Delhi
3.   Data Structure using C by ISRD Group, Tata McGraw Hills Education Pvt Ltd , New Delhi
4.   Data Structure by RS Salaria; Khanna Book Publishing Co. (P) Ltd., New Delhi
5.   Data Structures by Sanjiv Sofat, Khanna Publishers, New Delhi
6.   Expert Data Structures with C by R.B. Patel – Khanna Publishers, New Delhi.
7.   Data Structures and Algorithm Using C by RS Salaria, Khanna Book Publishing Co. (P) Ltd. New Delhi
8.   Data Structure using Pascal by Tenenbaum, Prentice Hall of India
9.   Data Structure using C by Robert Kruse, Prentice Hall of India
10.   Data Structure through C by Yashwant Kanekar, BPB Publications
11.   Data Structure through C in depth by SK Srivastava, Deepali Srivastava, BPB Publications
12.   Data Structure through "C" Language by Sameeran Chattopadhyay, Matangini Chottopadhyay, BPB Publications
13.   Data Structure through "C" Language by DOEACC, BPB Publications
14.   Data Structure using "C" Lab Workbook by Shukla, BPB Publications

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	16
2	12	18
3	10	16
4	10	16
5	10	16
6	12	18
Total	**64**	**100**

4.3   OBJECT ORIENTED PROGRAMMING USING JAVA

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RATIONALE

Object orientation is a new approach to understand the complexities of the real world. In contrast to the earlier approaches like procedural etc, object orientation helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. The students are already familiar with this concept of programming in C which is the basic for JAVA. This course offers the modern programming language JAVA that shall help the students to implement the various concept of object orientation practically. The students will be able to programme in the object oriented technology with the usage of JAVA.

LEARNING OUTCOME

After undergoing the subject, students will be able to:

- Explain the concepts of OOPS
- Explain and execute the language construct concepts.
- Debug and compile the program written in Java.
- Explain and implement class program.
- Explain and execute member functions.
- Describe and implement inheritance concepts.
- Explain and implement Polymorphism using Java program.
- Install Java IDE, Compiler, Java virtual machines
- Explain and implement the abstract class and interface.
- Implement the exception handling in live projects

DETAILED CONTENTS

1.   Introduction and Features   (05 hrs)

    1.1   Fundamentals of object oriented programming – procedure oriented programming Vs. object oriented programming (OOP)
    1.2   Object oriented programming concepts – Classes, object, object reference, abstraction, encapsulation, inheritance, polymorphism
    1.3   Introduction of eclipse (IDE) for developing programs in Java

2.   Language Constructs   (13 hrs)

    Review of constructs of C used in JAVA : variables, types and type declarations, data types, increment and decrement operators, relational and logical operators; if then else clause; conditional expressions, input using scanner class and output statement, loops, switch case, arrays, methods.

3.   Classes and Objects   (10 hrs)

      3.1   Creation, accessing class members
      3.2   Private Vs PublicVs Protected Vs Default
      3.3   Constructors
      3.4   Object & Object Reference

4.   Inheritance   (12 hrs)

Definition of inheritance, protected data, private data, public data, constructor chaining, order of invocation, types of inheritance, single inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance

5.   Polymorphism   (08 hrs)

Method & constructor overloading, method overriding, up-casting and down-casting.

6.   Abstract class & Interface   (08 hrs)

Key points of Abstract class & interface, difference between an abstract class & interface, implementation of multiple inheritance through interface.

7.   Exception Handling   (08 hrs)

Definition of exception handling, implementation of keywords like try, catch, finally, throw & throws. importance of exception handling in practical implementation of live projects.

LIST OF PRACTICALS

1.   Consider we have a Class of Cars under which Santro Xing, Alto and WaganR represents individual Objects. In this context each Car Object will have its own, Model, Year of Manufacture, Colour, Top Speed, etc. which form Properties of the Car class and the associated actions i.e., object functions like Create(), Sold(), display() form the Methods of Car Class. Use this class to create another class Company that tracks the models it create.

2.   In a software company Software Engineers, Sr. Software Engineers, Module Lead, Technical Lead, Project Lead, Project Manager, Program Manager, Directors all are the employees of the company but their work, perks, roles, responsibilities differs. Create the Employee base class would provide the common behaviors of all types of employee and also some behaviors properties that all employee must have for that company. Also include search method to search an employee by name.

3.   Suppose the Airport personals want to maintain records for the arrival and departure of the planes. Create a class Airport that has data like name, id, and address. Create two more classes for Arrival and Departure implementing Airport that will have track of planes (their name, id, arrival time or departure time and a counter to count the number of arrivals) also include the necessary methods to access these informations.

Also try to keep record of passengers by creating a new class Passenger. Also include a method search() in Airport class to search any passenger by name.

4.   Create a whole menu driven hospital management system using concept of OOP like classes, inheritance. Include information about the following:
a.   Patient -name, registration id, age, disease, etc.
b.   Staff – id, name, designation, salary, etc.

5.   Create a class called Musicians to contain three methods string ( ), wind ( ) and perc ( ). Each of these methods should initialize a string array to contain the following instruments:

- veena, guitar, sitar, sarod and mandolin under string ( )
- flute, clarinet saxophone, nadhaswaram and piccolo under wind ( )
- tabla, mridangam, bangos, drums and tambour under perc ( )

It should also display the contents of the arrays that are initialized. Create a derived class called TypeInsto contain a method called get ( ) and show ( ). The get ( ) method must display a means as follows.

Type of instruments to be displayed:

a.   String instruments
b.   wind instruments
c.   Percussion instruments

The show ( ) method should display the relevant detail according to our choice. The base class variables must be accessible only to its derived classes.

6.   Write three derived classes inheriting functionality of base class person (should have a member function that ask to enter name and age) and with added unique features of student, and employee, and functionality to assign, change and delete records of student and employee.

7.   Using the concept of multiple inheritance create classes: Shape, Circle, Square, Cube, Sphere, Cylinder. Your classes may only have the class variable specified in the table below and the methods Area and/or Volume to output their area and/or volume.

Class	Class Variable	Constructor	Base class
Shape	String name	Shape()	
Circle	double radius	Circle(double r, String n)	Shape
Square	double side	Square(double s, String n)	Shape
Cylinder	double height	Cylinder(double h, double r, String n)	Circle
Sphere	None	Sphere(double r, String n)	Circle
Cube	None	Cube(double s, String n)	Square

8.   Write a program to create class Person.

   a. Make two classes, Student and Instructor, inherit from Person. A person has a name and year of birth.
   b. A student has a major, student id.
   c. An instructor has salary, subject.

   Write the class definitions, the constructors, set methods, get methods and for all classes.

9.   Old MacDonald had a farm and several types of animals. Every animal shared certain characteristics: they had a type (such as cow, chick or pig) and each made a sound (moo, cluck or oink). An Interface defines those things required to be an animal on the farm. Define new classes for the Old MacDonald that implement the Animal and Farm class. Create array of object of animal to define the different types of animal in the farm. Also create appropriate methods to get and set the properties.

10.   Write a program with Student as abstract class and create derive classes Engineering, Medicine and Science from base class Student. Create the objects of the derived classes and process them and access them using array of pointer of type base class Student.

INSTRUCTIONAL STRATEGY

The subject is totally practical based. Students should be given clear idea about the basic concepts of programming. In practical session student should be asked to draw flow chart write algorithm and then write program for algorithm and run on computer. It is required that students should maintain records (files with printouts).

RECOMMENDED BOOKS

1.   Object Oriented Programming using JAVA by Sunil Bhutani & Amrendra Shara; Eagle Publishing House, Jalandhar
2.   Java Programming by Sachin Malhotra; Oxford University Press, New Delhi
3.   Head First Java, O-REILLY, Kathy Sierra & Bert Bates.
4.   Object-Oriented programming With Java, C.Thomas Wu.

5.   Advance Java Programming by Uttam K. Roy; Oxford University Press, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	05	10
2.	13	25
3.	10	20
4.	12	18
5.	08	09
6.	08	09
7.	08	09
Total	64	100

4.4 COMPUTER ARCHITECTURE

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RATIONALE

The subject provides the students with the knowledge of detailed organization of currently available personal computers in order to understand their functioning and maintenance. The students will also get familiar with different types of mother boards, architecture and bus standards.

LEARNING OUTCOME

After undergoing the subject, students will be able to:

- Illustrate the use of number system and coding system
- Compare and contrast different RISC and CISC architectures
- Understand the use of registers in computer organization
- Apply various arithmetic operations
- Identify different I/O interfaces
- Distinguish different types of intercepts and DMA
- Understand the purpose of memory hierarchy
- Compare and contrast the use of different memory organizations

DETAILED CONTENTS

1. Data Representation (10 hrs)

   Data Types-Number System, 1's Complement, 2's Complement, BCD Code, Gray Code

2. Central Processing Unit (10 hrs)

   Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Introduction to RISC, CISC architecture, Pipeline processing

3. Arithmetic Operations (12 hrs)

   Introduction, Addition, Subtraction, Multiplication and Division algorithm

4. Input-Output Organisation (16 hrs)

   Input-output interface, I/O bus and interface for module, I/ O vs memory bus. Isolated Vs memory mapped, IP modes of data transfer, first in first out buffer,

priority interrupt, daisy chaining priority, parallel priority   interrupt priority encoder, interrupt cycle, direct memory access DMA controller, DMA transfer

5.   Memory Organisation   (16 hrs)

Memory hierarchy; main memory, memory address, map, RAM and ROM chips, memory connection to CPU, auxiliary memory, associative memory, read and write operation, cache memory, associative maping, virtual memory, memory management hardware, memory segmentation.

INSTRUCTIONAL STRATEGY

As this paper is fully theoretical so it should be taught in a way to make it interesting by showing charts to the students to enable them to understand the subject theoretically. Block diagram of computer, algorithms to various arithmetic operations, CDs for demonstration should be used to make the students understand the subject.   After completing the subject, students must know how the computer works, about various types of controllers and memory organization.

RECOMMENDED BOOKS

1.   Computer Architecture by Rafiquzzaman, M; Prentice Hall of India, New Delhi.
2.   Computer Architecture by Carter, SOS: Tata McGraw Hill Education Pvt Ltd , New Delhi
3.   Fairhead – 80386/80486 BPB Publication, New Delhi
4.   Hardware and Software of Personal Computers by Bose, SK; Willey Eastern Ltd., New Delhi
5.   Structured Computer Organisation by Tanenbaum, Andrew S.; Prentice Hall of India, New Delhi.
6.   Upgrading and Preparing PCs by Scott Muller, Techmedia Publications
7.   Computer Organization and Architecture by Linda Labur, Narosa Publishing House Pvt. Ltd., Darya Ganj, New Delhi.
8.   Computer system Architecture by Morris Mano

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	15
2	10	15
3	12	20
4	16	25
5	16	25
Total	**64**	**100**

4.5   DATABASE MANAGEMENT SYSTEM (DBMS)

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RATIONALE

Database and database systems have become an essential component of everyday life in modern society.   This course will acquaint the students with the knowledge of fundamental concepts of DBMS and its application in different areas, storage, manipulation and retrieval of data using query languages.   Oracle/My SQL/SQL Server can be use as package to explain concepts.

LEARNING OUTCOME

After undergoing the subject, the students will be able to:

- Define and describe the database
- Contrast and compile the design of database architecture
- Convert and compare the designs and differentiate between the keys
- Convert database in the form of tables
- Normalize the data
- Provide the security to the database
- Respond various queries in the SQL

DETAILED CONTENTS

1.   Introduction   (06 hrs)

Database Systems; Database and its purpose, Characteristics of the database approach, Advantages and disadvantages of database systems. Classification of DBMS Users; Actors on the scene, Database Administrators, Database Designers, End Users, System Analysts and Application Programmers, Workers behind the scene (DBMS system designers and implementers, tool developers, operator and maintenance   personnel)

2.   Database System Concepts and Architecture   (06 hrs)

Data models, schemas, instances, data base state. DBMS Architecture; The External level, The conceptual level, The internal level, Mappings. Data Independence; Logical data Independence, Physical data Independence. Database Languages and Interfaces; DBMS Language, DBMS Interfaces. Classification of Database Management Systems

3.   Data Modeling using E.R. Model (Entity Relationship Model)   (10 hrs)

Data Models Classification; File based or primitive models, traditional data models, semantic data models. Entities and Attributes, Entity types and Entity sets, Key attribute and domain of attributes, Relationship among entities

4.   Relational Model: (06 hrs)

Relational Model Concepts: Domain, Attributes, Tuples and Relations. Relational constraints and relational database schemes; Domain constraints, Key constraints and constraints on Null. Relational databases and relational database schemes, Entity integrity, referential integrity and foreign key

5.   Normalization   (06 hrs)

Non-loss decomposition and functional dependencies, First, Second and Third normal forms, Boyce/Codd normal form, denormalization

6.   Database Access and Security   (06 hrs)

Database security, process controls, database protection, grant and revoke

7.   MYSQL/SQL (Structured Query Language)   (24 hrs)

SQL* DDL (Data Definition Languages): Creating Tables, Creating a table with data from another table, Inserting values into a table, updating columns of a Table, Deleting Rows, Dropping a Table. DML (Data Manipulation Language): Database Security and Privileges, Grant and Revoke Command, Maintaining Database Objects, Commit and Rollback, various types of select commands, various types of joins, sub query, aggregate functions.

LIST OF PRACTICALS FOR DBMS

1.   Exercises on creation and modification of structure of tables.
2.   Exercises on inserting and deleting values from tables.

3.   Exercises on quering the table (using select command).

4.   Exercises on using various types of joins.

5.   Exercises on using functions provided by database package.

6.   Exercises on commands like Grant, Revoke, Commit and Rollback etc.

7.   Design of database for any application.

INSTRUCTIONAL STRATEGY

Explanation of concepts using real time examples, diagrams etc. For practical sessions books along with CDs or learning materials with specified activities are required. Various exercises and small applications should be given along with theoretical explanation of concepts.

RECOMMENDED BOOKS

1) Fundamentals of Database Management Systems by Dr Renu Vig and Ekta Walia, - an ISTE, Publication, New Delhi
2) Database Management Systems by Arun K Majumdar and P Bhattacharya, Tata McGraw Hill Education Pvt Ltd, New Delhi
3) Introduction to DBMS by by ISRD Group, Tata McGraw Hill Education Pvt Ltd, New Delhi
4) Database Management Systems by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., New Delhi
5) An introduction to database systems by Date C.J. Adison Wesley
6) Fundamentals of Database Systems by Elmasri/Navathe/Adison Wesley
7) An Introduction to Database Systems by Bipin C. Desai, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi 110 002
8) SQL Unleashed by Hans Ladanyi Techmedia Publications, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	08
2	06	12
3	10	14
4	06	12
5	06	12
6	06	12
7	24	30
Total	**64**	**100**

4.6 COMPUTER NETWORKS AND SECURITY

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4 - 2

RATIONALE

The future of computer technology is in computer networks. Global connectivity can be achieved through computer networks. A diploma holder in computer engineering should therefore understand the function of networks. Knowledge about hardware and software requirements of networks is essential.

LEARNING OUTCOME

After undergoing the subject, the student will be able to:

- Setup Networking Labs
- Setup Basic Wireless Labs
- Diagnose & Solve Network Problems
- Diagnose & Solve Network Problems remotely
- Provide security to networks
- Manage & handle WAN
- Prevent external Network Attacks

DETAILED CONTENTS

1. Networks Basics   (08 hrs)

- What is network
- Models of network computing
- Networking models
- Peer-to –peer Network
- Server Client Network
- LAN, MAN and WAN
- Network Services
- Topologies
- Switching Techniques

2. Networking Models   (12 hrs)

- Standards
- OSI Reference Model
- TCP/IP Model

3.   Introduction to TCP/IP   (10 hrs)

- Concept of physical and logical addressing
- Different classes of IP addressing, special IP address
- Sub netting and super netting
- Loop back concept
- IPV4 and IPV6 packet Format
- Configuring IPV4 and IPV6

4.   Network Connectivity   (08 hrs)

- Network connectivity Devices
- NICs
- Hubs, Switches, Routers
- Configuration of Routers & Switches

5   Network Administration   (12 hrs)

- Network Security Principles, Cryptography, using secure protocols
- Trouble Shooting Tools: PING,IPCONFIG, IFCONFIG, NETSTAT, TRACEROOT,Wireshark, Nmap, TCPDUMP
- DHCP Server
- Web Server
- Workgroup/Domain Networking

6   Network Security   (10 hrs)

- Using ssh, sftp & https
- Virus, Worms and Trojans Definitions, preventive measures , deploying virus protection.
- Computer Network Attacks: Active Attacks, Passive Attacks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Denial-of-Service Attacks, Botnets, Phishing Attacks
- Firewalls Definition and types of firewalls, Configuring & deployment of Firewall

7   Introduction to Wireless Networks.   (04 hrs)

- Wireless Basics
- Wireless Security

LIST OF PRACTICALS

1.   Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.

2.   Recognition and use of various types of connectors RJ-45, RJ-11,BNC and SCST

3.   Making of cross cable and straight cable

4.   Install and configure a network interface card in a workstation.

5.   Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation

6.   Managing user accounts in windows and LINUX

7.   Study and Demonstration of sub netting of IP address

8.   Use of Netstat and its options.

9.   Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG

10.   Installation of Network Operating System(NOS)

11.   Visit to nearby industry for latest networking techniques

Required Software

➢   Windows Server/Linux Server

Required Tools and Supplies

1)   Crimping tool, Cable tester,
2)   RJ 45 connectors, RJ-11, BNC, SCST
3)   Coaxial Cable, UTP, STP, OFC cable
4)   Screw Driver Kit
5)   Switch/Hub
6)   Manageable Switch

INSTRUCTIONAL STRATEGY

Since the facilities are not available in the polytechnic, students need exposure to various security systems and software available in some organisations, universities and engineering colleges. For this, visits may be organized for students. The teachers should also be exposed in this area. Some practicals can be conducted in the laboratory.

RECOMMENDED BOOKS

1. Computer Networks by Tanenbaum, Prentice Hall of India, New Delhi
2. Data Communications and Networking by Forouzan, (Edition 2nd and 4th), Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Data and Computer Communication by William Stallings, Pearson Education, New Delhi
4. Local Area Networks by Peter Hudson
5. Understanding Local Area Network by Neil Jenkins
6. Area Networks by Stan Schatt, Prentice Hall of India, New Delhi
7. Network+ Lab manual,- BPB Publications -by Tami Evanson
8. Networking Essentials – BPB Publications New Delhi
9. Computer Network and Communications By V.K. Jain and Narija Bajaj, Cyber Tech Publications, New Delhi.
10. Linux – The complete Reference by Richard Peterson, Tata McGraw Hill Education Pvt Ltd, New Delhi.
11. Linux – Install and Configuration Black Book by Dee Annleblanc and Issac Yates, IDG Books India Private Limited, Delhi.
12. Unleashed Linux by TechMedia Publishers, New Delhi
13. Computer Network by J.S. Katre, Tech-Max Publication, Pune

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	08	12
2.	12	18
3.	10	16
4.	08	12
5.	12	18
6.	10	16
7.	04	08
Total	**64**	**100**

ENTREPRENEURIAL AWARENESS CAMP

This is to be organized at a stretch for two to three days during fourth semester. Lectures will be delivered on the following broad topics by experts. There will be no examination for this subject

1. Who is an entrepreneur?

2. Need for entrepreneurship, entrepreneurial career and wage employment

3. Scenario of development of small scale industries in India

4. Entrepreneurial history in India, Indian values and entrepreneurship

5. Assistance from District Industries Centres, Commercial Banks. State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations

6. Considerations for product selection

7. Opportunities for business, service and industrial ventures

8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)

9. Legal aspects of small business

10. Managerial aspects of small business