6.1 NETWORK SECURITY

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RATIONALE

This course has been designed by keeping in view the basic computer users and information system managers. The concepts needed to read through the ripe in the market place and understanding risks and how to deal with them. It is hoped that the student will have a wider perspective on security in general and better understanding of how to reduce and manage the security risks.

DETAILED CONTENTS

1. Introduction   (6 hrs)

    Need for securing a network; Principles of Security, Type of attacks, introduction to cyber crime, cyber law-Indian Perspective (IT Act 2000 and amended 2008), cyber ethics, ethical hacking. What is hacking? attacker, phreaker etc.

2. Securing Data over Internet   (12 hrs)

    Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, overview of DES, RSA and PGP. Introduction to Hashing: MD5, SSL, SSH, HTTPS, Digital Signatures, Digital certification, IPSec

3. Virus, Worms and Trojans   (8 hrs)

    Definitions, preventive measures – access central, checksum verification, process configuration, virus scanners, heuristic scanners, application level virus scanners, deploying virus protection.

4. Firewalls   (4hrs)

    Definition and types of firewalls, firewall configuration, Limitations of firewall.

5. Intrusion Detection System (IDS)   (3 hrs)

    Introduction; IDS limitations – teardrop attacks, counter measures; Host based IDS set up

6. Handling Cyber Assets- Configuration policy as per standards, Disposable policy   (3 hrs)

7.   Virtual Private Network (VPN)   (6 hrs)

     Basics, setting of VPN, VPN diagram, configuration of required objects, exchanging keys, modifying security policy

8.   Disaster and Recovery   (6 hrs)

Disaster categories; network disasters – cabling, topology, single point of failure, save configuration files; server disasters – UPS, RAID, Clustering, Backups, server recovery

Note: A visit to organizations must be organized for the demonstration about network security and exposure to available software

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.

LIST OF PRACTICALS

1.   Installation and comparison of various anti virus software

2.   Installation and study of various parameters of firewall.

3.   Writing program in C to Encrypt/Decrypt using XOR key.

4.   Study of VPN.

5.   Study of various hacking tools.

6.   Practical applications of digital signature.

RECOMMENDED BOOKS

1.   Cryptography and Network Security by Forouzon, Tata Mc Graw Hill Education Pvt Ltd, New Delhi

2.   Cryptography and Network Security by Atul Kahate, Tata Mc Graw Hill Education Pvt Ltd, New Delhi

3.   Cryptography and Network Security by Padmanabham, Wiley India Pvt Ltd. Daryaganj, New Delhi

4.   Network Security by Eric Cole, Bible, Wiley- India Pvt Ltd. Daryaganj, New Delhi

5.   Network security by William Stalling

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	6	10
2.	12	20
3.	8	20
4.	4	10
5.	3	10
6.	3	10
6.	6	10
7.	6	10
Total	**48**	**100**

6.2   DISTRIBUTED COMPUTING

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RATIONALE : This course offers an overview of the basic concepts of grid computing, cloud computing and other computing technologies. This course will also give an insight into architecture, service models and deployment models of cloud computing and advantages of grid and cloud computing.

DETAILED CONTENTS

1. Cloud Computing   (12 hrs.)
    –   Overview of Cloud Computing
    –   Characteristics of Cloud Computing
    –   Advantages of Cloud Computing
    –   Challenges of Cloud Computing
    –   Applications of Cloud Computing

2. Cloud Computing Service Models and deployment Models   (12 hrs.)
    –   Service Model- Saas, Paas, Iaas
    –   Deployment Models : Private Cloud, Public Cloud, Hybrid Cloud, Community Cloud

3. Grid Computing   (12 hrs.)
    –   Overview
    –   Advantages
    –   Virtual Organizations
    –   Applications

4.   Other Technologies   (12 hrs.)

    –   Cluster Computing
    –   Peer to Peer Networks
    –   Utility Computing
    –   Ubiquitous Computing
    -- Comparison of Grid, Cluster and Cloud Computing

INSTRUCTIONAL STRATEGY

The subject contents are designed keeping in view the future trends. Although this is theoretical subject, sufficient time is given in which the students can be taken to the laboratory and some practical hand on experience be given to the students using free ware Cloud Platforms available to give students better understands of the topic.

RECOMMENDED BOOKS

1. Cloud Computing Bible by Berrie Sorinby
2. Cloud Computing, A Practical Approach by Toby Velte, Anthony Velte
3. Introduction to Grid Computing by Bart Jacob and Michael Brown

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	25
2	12	25
3	12	25
4	12	25
Total	**48**	**100**

6.3   PROGRAMMING IN JAVA

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RATIONALE

Today, the most likely place you will find Java is on World Wide Web. The web acts as convenient transport mechanism for Java programs and the web's ubiquity has popularized Java as an Internet development tool. Java has shifted the programming paradigm of single machine to distributed network of machines. Any application on World Wide Web can be easily implemented. Internet can have numerous applications and various protocols. This course will enable the students to learn in detail network programming language Java.

DETAILED CONTENTS

1.   Introduction to Java   (8 hrs)
      A brief history, how Java works?, Java Virtual Machine (JVM), Java In Time (JIT) compiler, Java features, using Java with other tools, native code, Java application types, comparison with C and C++

2.   Working with data types, control flow statements, arrays, casting, command line arguments   (10 hrs)

3.   Java Classes and Memory Management   (8 hrs)

      Introduction to Classes, inheritance, encapsulation and polymorphism, constructors and finalizers, garbage collection, access specifier

4.   Interfaces and Packages   (4 hrs)

      Using Java interface, using Java packages

5.   Exception Handling and Stream Files   (6 hrs)

      Over view of exception handling, method to use exception handling, method available to exceptions (The throw statement, the throws class, finally class), creating your own exception classes

6.   Threads and Multi-threading   (6 hrs)

      Overview, thread basics – creating and running a thread, The thread control methods, The threads life cycle and synchronization

7.   Introduction to Applet, Application and JDK   (6 hrs)

      Java applets Vs Java applications, building application with JDK, building applets with JDK, HTML for Java applets, managing input-output stream

LIST OF PRACTICALS

1	a) Write a program which tells whether a number is even or odd. Take a range from 1 – 50

	b) Display the output which is given below:
	     *
	     * *
	     * * *

	c) Write a program which sorts an array of type integer
	d) Write a programme to determine the sum of the following harmonic series for a given value of n: 1+1/2+1/3………..+1/n the value of n should be given interactively through the keyboard
2	Write a programme to convert the given temperature in Fahrenheit to Celsius using the following conversion formula C = F.32/1.8 and display the value in a tabular form
3	Write a programme to find all the numbers and sum of all integers greater than 100 less than 200 that are divisible by 7
4.	Given a list of marks ranging from 0 to 100, write a programme to compute and print the number of student should have obtained marks (a) in the range 81 to 100 (ii) in the range 61 to 80 (c) in the range 41 to 60 (d) in the range 0 to 40. The programme should use a minimum number of if statement
5.	Admission to a professional course is subject to the following conditions: Marks in mathematics >=60 Marks in physics >=50 Marks in chemistry >=40 Total in all 3 subjects >=200 (OR) Total in mathematics and physics >=150 given the marks in the 3 subjects. Write the programme to process the application to list the eligible candidates
6.	The number in the sequence 1 1 2 3 5 8 13 21 ………. Are called Fibonacci numbers. Write programme using a do ….. while loop to calculate and print the first m ibonacci numbers (Hint: after the first 2 numbers in the series, each number is the sum of the 2 preceding the numbers)

7.	Write a programme to evaluate the following investment equation $V=P(1+r)n$ and print the tables which would give the value of V for various combination of the following values of P, r and n.
8.	Write a program which will store the students roll no. names and total marks in the database
9.	Write a program which will display all those records whose marks are above 75%
10.	Write a programme to draw the following using Applet:
11.	Exercises on implementing Java Classes.
12.	Exercises on exceptional handling
13.	Exercises on creating and running threads

INSTRUCTIONAL STRATEGY

The subject deals with object oriented concept. As the subject has both theory and practicals, more stress should be given to practical work.

RECOMMENDED BOOKS

1. The Complete Reference Java by Herbel Schildt; McGraw Hill, New Delhi

2. Java Programming by Balagurusamy, Tata McGraw Hill Education Pvt Ltd , New Delhi

3. Computer Programming in Java, W C/D by Junaid Khateeb, Wiley-India Pvt Ltd. Daryaganj, New Delhi

4. The Complete Reference by Patrick Naughton, Tata McGraw Hill Education Pvt Ltd , New Delhi

5. Set of Books on Java by Sun Microsystems

6. Java 2 Programming Bible by Aaron Walsh, Justin Couch, Daniel Steinberg, IDG Books India Pvt. Ltd., Netaji Subhash Marg, Darya Ganj, New Delhi

7. Java Pogramming- "How to Program Java" by Dietal and Dietel

8. An Introduction to Java Programming by Y Daniel Liang; Prentice Hall of India

9. Core Java by Cay S Horseman and Lray Carnell.

10. Introduction to Cryptography with applets by David Bishop, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	8	18
2	10	20
3	8	18
4	4	8
5	6	12
6	6	12
7	6	12
Total	**48**	**100**

6.4   EMPLOYABILITY SKILLS – II

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RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. Our diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject to prepare students for employability in job market and survive in cut throat competition among professionals.

DETAILED CONTENTS

1.   Oral Practice

i)	Mock interview	(05 hrs)
ii)	Preparing for meeting	(05 hrs)
iii)	Group discussion	(05 hrs)
iv)	Seminar presentation	(05 hrs)
v)	Making a presentation	(12 hrs)

       a)   Elements of good presentation

       b)   Structure and tools of presentation

       c)   Paper reading

       d)   Power point presentation

6.5   ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

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RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. This subject focuses on imparting the necessary competencies and skills of enterprise set up and its management.

DETAILED CONTENTS

SECTION – A   ENTREPRENEURSHIP

1.   Introduction   (14 hrs)

- Concept /Meaning and its need
- Qualities and functions of entrepreneur and barriers in entrepreneurship
- Sole proprietorship and partnership forms of business organisations
- Schemes of assistance by entrepreneurial support agencies at National, State, District level: NSIC, NRDC, DC:MSME, SIDBI, NABARD, Commercial Banks, SFC's TCO, KVIB, DIC, Technology Business Incubator (TBI) and Science and Technology Entrepreneur Parks (STEP).

2.   Market Survey and Opportunity Identification   (10 hrs)

- Scanning of business environment
- Salient features of National and State industrial policies and resultant business opportunities
- Types and conduct of market survey
- Assessment of demand and supply in potential areas of growth
- Identifying business opportunity
- Considerations in product selection

3.   Project report Preparation   (08 hrs)

- Preliminary project report
- Detailed project report including technical, economic and market feasibility
- Common errors in project report preparations
- Exercises on preparation of project report

SECTION –B   MANAGEMENT

4.   Introduction to Management   (04 hrs)

- Definitions and importance of management
- Functions of management: Importance and Process of planning, organising, staffing, directing and controlling
- Principles of management (Henri Fayol, F.W. Taylor)
- Concept and structure of an organisation
- Types of industrial organisations

    a) Line organisation
    b) Line and staff organisation
    c) Functional Organisation

5.   Leadership and Motivation   (03 hrs)

 a) Leadership

- Definition and Need
- Qualities and functions of a leader
- Manager Vs leader
- Types of leadership

 b) Motivation

- Definitions and characteristics
- Factors affecting motivation
- Theories of motivation (Maslow, Herzberg, McGregor)

6.   Management Scope in Different Areas   (06 hrs)

 a) Human Resource Management

- Introduction and objective
- Introduction to Man power planning, recruitment and selection
- Introduction to performance appraisal methods

 b) Material and Store Management

- Introduction functions, and objectives
- ABC Analysis and EOQ

 c) Marketing and sales

- Introduction, importance, and its functions

- Physical distribution
- Introduction to promotion mix
- Sales promotion

d) Financial Management

- Introductions, importance and its functions
- Elementary knowledge of income tax, sales tax, excise duty, custom duty and VAT

7. Miscellaneous Topics   (03 hrs)

a) Customer Relation Management (CRM)

- Definition and need
- Types of CRM

b) Total Quality Management (TQM)

- Statistical process control
- Total employees Involvement
- Just in time (JIT)

c) Intellectual Property Right (IPR)

- Introductions, definition and its importance
- Infringement related to patents, copy right, trade mark

Note: In addition, different activities like conduct of entrepreneurship awareness camp extension lecturers by outside experts, interactions sessions with entrepreneurs and industrial visits may also be organised.

INSTRUCTIONAL STRATEGY

Some of the topics may be taught using question/answer, assignment or seminar method. The teacher will discuss stories and case studies with students, which in turn will develop appropriate managerial and entrepreneurial qualities in the students. In addition, expert lecturers may also be arranged from outside experts and students may be taken to nearby industrial organisations on visit. Approach extracted reading and handouts may be provided.

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development published by Tata McGraw Hill Publishing Company Ltd., New Delhi

3. Entrepreneurship Development in India by CB Gupta and P Srinivasan; Sultan Chand and Sons, New Delhi
4. Entrepreneurship Development - Small Business Enterprises by Poornima M Charantimath; Pearson Education, New Delhi
5. Entrepreneurship : New Venture Creation by David H Holt; Prentice Hall of India Pvt. Ltd., New Delhi
6. Handbook of Small Scale Industry by PM Bhandari
7. Principles and Practice of Management by L M Prasad; Sultan Chand & Sons, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	14	28
2	10	20
3	08	16
4	04	10
5	03	06
6	06	14
7	03	06
Total	**48**	**100**

6.6   PROJECT WORK

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RATIONALE

Project Work aims at developing innovative skills in the students whereby they apply in totality the knowledge and skills gained through the course work in the solution of particular problem or by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work, they would like to execute. It is also essential that the faculty of the respective department may have a brainstorming to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. There should not be more than 3 students if the project work is given to a group. The students should identify themselves or accept the given project assignment at least two to three months in advance. The project work identified in collaboration with industry should be preferred. Each teacher is expected to guide the project work of 5–6 students.

The project assignments may consist of:

- Programming customer based applications

- Web page designing using database connectivity

- Development of Database applications

- Setting up and Configuring Local Area Network

- User interface and design

- Fault-diagnosis and rectification of computer systems and peripherals

- Bringing improvements in the existing systems software

- Projects related to Multimedia specifically

- Projects related to Computer Graphics

- Hosting of Online applications

- Configuration of Network Operating System(Windows, Linux)

- Projects related to system utilities like editor Word processor

- Project related to mobile based applications

- Projects related to applications packages useful for the organizations in the nearby vicinity of the institute

- Configuration of servers (Proxy, DNS etc)

A suggestive criterian for assessing student performance by the external (personnel from industry) and internal (teacher) examiner is given in table below:

Sr. No.	Performance criteria	Max.** marks	Rating Scale				
			Excellent	Very Good	Good	Fair	Poor
1.	Selection of project assignment	10	10	8	6	4	2
2.	Planning and execution of considerations	10	10	8	6	4	2
3.	Quality of performance	20	20	16	12	8	4
4.	Providing solution of the problems or production of final product	20	20	16	12	8	4
5.	Sense of responsibility	10	10	8	6	4	2
6.	Self expression/ communication skills	5	5	4	3	2	1
7.	Interpersonal skills/human relations	5	5	4	3	2	1
8.	Report writing skills	10	10	8	6	4	2
9.	Viva voce	10	10	8	6	4	2
	Total marks	**100**	**100**	**80**	**60**	**40**	**20**

The overall grading of the practical training shall be made as per following table

	Range of maximum marks	**Overall grade**
i)	More than 80	Excellent
ii)	79 <> 65	Very good
iii)	64 <> 50	Good
iv)	49 <> 40	Fair
v)	Less than 40	Poor

In order to qualify for the diploma, students must get "Overall Good grade" failing which the students may be given one more chance of undergoing 8 -10 weeks of project oriented professional training in the same industry and re-evaluated before being disqualified and declared "not eligible to receive diploma ". It is also important to note that the students must get

more than six "goods" or above "good" grade in different performance criteria items in order to get "Overall Good" grade.

Important Notes

1. **This criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks as per the above criteria.**

2. **The criteria for evaluation of the students have been worked out for 100 maximum marks. The internal and external examiners will evaluate students separately and give marks as per the study and evaluation scheme of examination.**

3. **The external examiner, preferably, a person from industry/organization, who has been associated with the project-oriented professional training of the students, should evaluate the students performance as per the above criteria.**

4. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific nearby industries are approached for instituting such awards.

The teachers are free to evolve another criteria of assessment, depending upon the type of project work.

The students must submit a project report of not less than 50 pages (excluding coding). The report must follow the steps of Software Engineering Concepts

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organizations in such an exhibition. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific industries are approached for instituting such awards.