

5.1 JAVA PROGRAMMING

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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 (6 hrs)
A brief history, how Java works. Java Virtual Machine (JVM), Java in time compiler (JIT), 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 (6 hrs)
3. Java Classes and Memory Management (6 hrs)
Introduction to Classes, inheritance, encapsulation and polymorphism, constructors and finalizers, garbage collection, access specifier
4. Interfaces and Packages (6 hrs)
Using Java interface, using Java packages
5. Exception Handling and Stream Files (8 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
8. Java Data Base Connectivity (JDBC) (4 hrs)

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: $1+1/2+1/3+\dots+1/n$ 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 fibonacci 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:



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. Mastering Java by John Zukowski; BPB Publication, New Delhi
2. The Complete Reference by Patrick Naughton, Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Java Programming by Balagurusamy, Tata McGraw Hill Education Pvt Ltd , New Delhi
4. Set of Books on Java by Sun Microsystems
5. Java 2 Programming Bible by Aaron Walsh, Justin Couch, Daniel Steinberg, IDG Books India Pvt. Ltd., Netaji Subhash Marg, Darya Ganj, New Delhi
6. Java 2 Swing, Servlets, JDBC and Java Beans Programming Black Book by steven Holzner, IDG Books India Pvt. Ltd., 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. The Complete Reference Java by Herbel Schildt; McGraw Hill, New Delhi
10. Core Java by Cay S Horseman and Lray Carnell.
11. 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

Sr. No.	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction to Java	6	10
2	Working with Data types	6	10
3	Java Classes and Memory Management	6	10
4	Interfaces and Packages	6	10
5	Exception Handling and Stream Files	8	30
6	Threads and Multi-threading	6	10
7	Introduction to Applet, Application and JDK	6	10
8	Java Data Base Connectivity (JDBC)	4	10
Total		48	100

5.2 OPERATING SYSTEMS (OS)

[Common in Computer Engineering and I.T.]

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RATIONALE

The course provides the students with an understanding of human computer interface existing in computer system and the basic concepts of operating system and its working. The students will also get hands-on experience and good working knowledge to work in windows and Linux environments. The aim is to gain proficiency in using various operating systems after undergoing this course. While imparting instructions, the teachers are expected to lay more emphasis on concepts and principles of operating systems, its features and practical utility.

DETAILED CONTENTS

1. Overview of Operating Systems (04 hrs)
 Definition of Operating Systems, Types of Operating Systems, Importance of Operating Systems, Memory organization, Linking, loading and executing control program
2. Functions of Operating System (24 hrs)
 Process Management Functions (Principles and Brief Concept); Job Scheduler, Process Scheduler, Process synchronization etc.. Memory Management Function (Principles and Brief Concept); Introduction, Single Process System, Fixed Partition Memory, System Loading, Segmentation, Swapping, Simple Paging System, Virtual Memory etc.. I/O Management Functions (Principles and Brief Concept); Dedicated Devices, Shared Devices, I/o Devices, Storage Devices, Buffering, Spooling. File Management; Principles and Brief Concept, Types of File System; Simple file system, Basic file system, Logical file system, Physical file system. Dead Lock; Condition for Dead lock, Dead Lock Preventions, Dead Lock Avoidance
3. Linux Operating System (20 hrs)
 Introduction, history of Linux and Unix, Linux Overview, Structure of Linux, Linux releases, open Linux, system requirements, file structures, processor scheduling and memory management in Unix. Linux Commands and Filters: Shell: concepts of command options, input, output redirecting and network file, process and communication commands like: mkdir, cd, ls, who, whoami, cat, more, tail, head, mv, chmod, grep, wc, sort, kill, write, wall, mail, news

LIST OF PRACTICALS

1. Directory commands
2. File commands
3. Process management

4. Using file permission commands
5. Mail commands
6. Editing file system rights in a **Linux** environment.
 - a) Interfacing with the network (Ethernet)
 - b) Preparing of network cables including hubs, connectors etc.
 - c) Establishment of LAN network for homogeneous systems
 - d) Establishment of LAN network for heterogeneous systems
 - e) Use of protocols and gateways in establishing LAN
 - f) Writing small programs such as file security, file transfer, remote testing
 - g) Trouble shooting of networks
 - h) Writing login scripts

INSTRUCTIONAL STRATEGY

This subject is both theory and practical oriented. Therefore, stress must be given on particulars along with theory. Laboratory must have windows as well as Linux operating system. Concepts of O.S. must be taught practically.

RECOMMENDED BOOKS

1. Operating Systems by Achyut S Godbole and Atul Kahate: Tata McGraw Hill Education Pvt Ltd , New Delhi
2. System Programming by John J Donovan, Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Linux – The Complete Reference by Richard Peterson, Tata McGraw Hill, New Delhi
4. Operating Systems by Stallings Tata McGraw Hill.
5. Operating System by Hemant Kapila, Eagle Prakashan, Jalandhar.
6. Operating Systems- A Concept Based Approach by Dham Dhare, Tata McGraw Hill Education Pvt Ltd , New Delhi
7. System Programming by Dham Dhare, Tata McGraw Hill Education Pvt Ltd , New Delhi
8. Operating System Concepts by Ekta Walia, Khanna Publishers, New Delhi.
9. Unleashed Linux by Tech Media Publishers, New Delhi
10. Linux – Install and Configuration Black Book by Die Annlebalnc and Issac Yates, IDG Books India Private Ltd., New Delhi.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (hrs)	Marks Allotted (%)
1.	Overview of Operating Systems	4	20
2.	Functions of Operating System	24	50
3.	Linux Operating System	20	30
Total		48	100

5.3 COMPUTER NETWORKS

[Common in Computer Engg., I.T., ECE, ELTX. (μP)]

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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.

DETAILED CONTENTS

- | | | |
|----|---|----------|
| 1. | Networks Basics | (6 hrs) |
| | <ul style="list-style-type: none"> - 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. | OSI Model | (8 hrs) |
| | <ul style="list-style-type: none"> - Standards - OSI Reference Model - OSI Physical layer concepts - OSI Data-link layer concepts - OSI Networks layer concepts - OSI Transport layer concepts - OSI Session layer concepts - OSI presentation layer concepts - OSI Application layer concepts | |
| 3. | Introduction to TCP/IP | (10 hrs) |
| | <ul style="list-style-type: none"> - 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. | Protocol Suites | (3 hrs) |
| | <ul style="list-style-type: none"> - Models and Protocols | |

- Network IPX/SPX
 - Intranet Protocols
5. Network Architecture (8 hrs)
- ARC net specifications
 - Ethernet Specification and Standardization:
10 Mbps (Traditional Ethernet), 10 Mbps (Fast Ethernet) and 1000 Mbps (Gigabit Ethernet), Introduction to Media Connectivity (Leased lines, ISDN, PSTN, RF, VSAT, Optical and IPLC)
6. Network Connectivity (6 hrs)
- Network connectivity Devices
 - NICs
 - Hubs
 - Repeaters
 - Multiplexers
 - Modems
 - Routers and Protocols,
 - Firewall
 - ATM
 - VOIP and Net-to-Phone Telephony,
 - Laws and Protocols
7. Network Printing (3 hrs)
- Print Services
8. Network Administration / Security (9 hrs)
- Client/Server Technology
 - Server Management
 - RAID management and mirroring
 - Hauffman codes
 - Cryptography
9. Network Trouble Shooting Techniques (6 hrs)
- Trouble Shooting process
 - Trouble Shooting Tools: PING,IPCONFIG, IFCONFIG, NETSTAT, TRACEROOT, Wiresharp/ Dsniffer/ Pcop
10. Wireless Networking (05 hrs)
- Basics of Wireless: Wireless MAN, Networking, Wireless LAN, Wi-Fi, WiMax(Broad-band Wireless) and Blue-Tooth technology.

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, crone 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

This subject deals with both theory and practicals. The students should be made to practically establish LAN with various hardware and software and their integration.

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 Anneblanc 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 FOR FACILITATING THE PAPER SETTER

Topic No.	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Networks Basics	6	10
2	OSI Model	8	10
3	Introduction to TCP/IP	10	15
4	Protocol Suites	3	05
5	Network Architecture	8	15
6	Network Connectivity	6	10
7	Network Printing	3	05
8	Network Administration / Security	9	15
9	Network Troubleshooting Techniques	6	10
10	Wireless Networking	5	05
Total		64	100

5.4 Visual Programming (Using VB .NET) (Common in Computer Engineering and Information Technology)

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RATIONALE

VB .NET is the visual programming technique based on Object Oriented Concepts. This subject will give the students an indepth understanding the features of VB .NET. The practical exercise of VB.NET during the course of study will reinforce the understanding of the subject.

DETAILED CONTENTS

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|---|---|-----------|
| 1 | Introduction to Microsoft. Net Framework | (06 hrs) |
| | Introduction to client server architecture, Introduction to .NET framework, feature of .Net framework, architecture and component of .Net, elements of .Net. Common Language Runtime (CLR), Common Type System (CTS), Common Language Specifications (CLS), Microsoft Intermediate Language (MSIL), Just In Time Compiler. | |
| 2 | VB.NET Integrated Development Environment | (04 hrs) |
| | VB.NET Development Environment, Creating Applications, Building Projects Using simple components, Running VB .NET applications. | |
| 3 | VB.NET Basics | (12 hrs) |
| | Visual Basic .NET Programming Language-Variables & Data Type, Strings, Arithmetic Operators, Building the project, Common Control Controls, Functions Call and Arguments, Select Case, Loops, Nesting of Loops, Decision Structures, Error handling using Try.. Catch Block | |
| 4 | Windows Applications | (10 hrs) |
| | Developing Windows Applications: Introduction to Windows Applications, Using Windows Forms, Visual Inheritance, Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons, List Boxes, Combo Boxes, Picture Boxes, Scrollbars, Splitters, Timer, Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars. | |
| 5 | Database Connectivity | (10 hrs) |
| | Database Programming with ADO.NET: ADO.NET Object Model, Database: Connections, Data adapters and datasets, Data Reader, Connection to database with server explorer, Multiple Table Connection, Data binding with controls like Text Boxes, List Boxes, Data grid etc. Navigating data source, Data Grid View, Data form wizard, Data validation, Connection Objects, Command Objects, Data Adapters, Dataset Class. | |

6 Crystal Reports (06 hrs)

Crystal reports, Connection to Database, Table, Queries, Building Report, Modifying Report, Formatting Fields and Object.

LIST OF PRACTICALS

1. Exercise on opening projects.
2. Exercise on all the menus of opening window of VB .NET
3. Exercise on all basic Controls.
4. Exercise on designing form.
5. Exercise on Database Connectivity.
6. Exercise on Creating Crystal reports.

RECOMMENDED BOOKS

1. Visual Basic.NET by C Muthu, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Visual Basic.NET Step by Step by Michael Halvorson
3. Applications of .NET Technologies, by ISRD Group, Tata McGraw Hill Education Pvt Ltd , New Delhi
4. Programming Microsoft visual Basic .NET-Francesco Balena
5. Visual Programming by Vipin Arora, Eagle Prakashan, Jalandhar.
6. The complete Reference-Visual Basic. NET- Jeffrey R. Shapiro
7. Murach's VB .NET database programming with ADO.NET-Anne Prince and Doug Lowe

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction to Microsoft. Net Frame work	6	15
2	VB.NET Integrated Development Environment	4	10
3	VB.NET Basics	12	20
4	Windows Applications	10	25
5	Database Connectivity	10	20
6	Crystal Reports	6	10
Total		48	100

Elective-I

5.5(a) MOBILE COMPUTING

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RATIONALE

The ubiquity of wireless communication technologies and the proliferation of portable computing devices have made possible a mobile computing era in which users, on the move, can seamlessly access network services and resources, from anywhere and at anytime. This course provides an introduction to the fundamentals of mobile computing. A background in computer networks and wireless communication is required.

DETAILED CONTENTS

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|----|--|----------|
| 1. | Introduction | (04 hrs) |
| | Evolution of wireless networks, wireline and wireless data networks, advantages of mobile computing, networks, middleware and gateways, application, services and security | |
| 2. | Mobile Computing Architecture | (05 hrs) |
| | 3-tier architecture, design considerations for mobile computing, mobile computing through internet | |
| 3. | Cellular Networks | (06 hrs) |
| | GSM principles and architecture, GPRS architecture, EDGE, 3G, CDMA Technologies | |
| 4. | Wireless System and Standards | (06 hrs) |
| | Bluetooth, RFID, IEEE 802.11.a/b/g/n, Mobile IP, IPV6, JAVA Card, Features of WIMAX | |
| 5. | Wireless Application Protocol (WAP) | (06 hrs) |
| | WAP, MMS, GPRS Applications | |
| 6. | Operating Systems for Mobile Devices | (05 hrs) |
| | Design constraints in applications for handheld devices, palm and symbian OS features and architecture, introduction to J2ME technology | |

INSTRUCTIONAL STRATEGIES

Since the subject is comparatively new and the students are required some background of other subjects like computer networks and wireless communication. So while explaining of concepts, real-time examples and case studies may be used. In addition, institute may arrange visits to places

LIST OF PRACTICALS

Note: Since this subject requires equipment and the polytechnics don't have so institutions can contact organizations where these are available

1. Visit to institutes to see Wi-Fi, WiMax setup
2. Visit to service providers like: BSNL, AirTel etc. to see GSM, GPRS and 3G technologies
3. Developing applications for hand-held mobile devices using (a) WAP/WML (b) J2ME/ J2EE
4. Installation of OS (palm, symbian etc.)

RECOMMENDED BOOKS

1. Mobile Computing : Technology, Applications and Service Creation by Asoke K. Talukdar and Roopa R. Yavagal, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Wireless Communication: Principles and Practice by Theodor S. Rappaport, Pearson Education Asia, 2nd Edition.
3. Principles of Mobile Computing by Owe Hansman, Lothar Merk, Martin S Nicklous and Thomas Stober, Springer-Verlag, 2nd Edition, 2003, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction	04	10
2	Mobile Computing Architecture	05	15
3	Cellular Networks	06	20
4	Wireless System and Standards	06	25
5	Wireless Application Protocol (WAP)	06	15
6	Operating Systems for Mobile Devices	05	15
	Total	32	100

Elective-I
5.5(b) OPEN SOURCE TECHNOLOGIES
(Common in Computer Engineering and Information Technology)

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RATIOANLE

This subject is a step to expose the students towards open source technologies. Linux is a very good example of open source s/w. So linux is prime focus and other technologies based on matter students should be able to use open source s/w primarily in linux environment.

DETAIL CONTENTS

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|----|---|----------|
| 1. | Introduction | (02 hrs) |
| | Introduction to Open Source Technologies, like LINUX, Apache, My SQL, PHP, etc. Comparison of open source and proprietry Software, difference between freeware and open source. Concept of GPL (General Public License). | |
| 2. | Practice with Linux Commands | (04 hrs) |
| | CP, rm, chmod, mic, password, ls, grep and restore (egep and grep), sort, cmp, diff, tar, CPio, dump, find, Cron, Crontab, mount, umount, compress, unzip, cat, gzip. | |
| 3. | Shell Programming | (10 hrs) |
| | Introduction to Korn shell, Bourne shell, C shell and their functionality, Mata characters, redirection, file name substitution, pipes, common Built in Commands like Eval, Execc, Umask, etc. and shell programming in context of any of three shells. | |
| 4. | Communication Commands(utilities) | (04 hrs) |
| | Telnet, talk write, mail, wall, finger, stp, rcp, rlogin, configuration of DHCP. | |
| 5. | Introduction to C/C++ Programming in Linux environment. | (08 hrs) |
| 6. | Introduction to Apache Server with PHP and My SQL. | (04 hrs) |

LIST OF PRACTICLES

1. Practice of Linux commands-I
2. Practice of Linux commands-II
3. Shell programming-I
4. Shell programming-II
5. Experiments with communication commands.
6. WAP on Text handling in C Programming under Linux environment.

7. WAP to find Prime numbers in C++/C Programming under Linux environment.
8. Program related to file handling in C/C++ under Linux environment.
9. Configuration of DHCP (Dynamic Host Control Protocol)
10. Programming with Arrays in C/C++ under Linux
11. Download and Installation of LAMP (Linux Apache My SQL PHP) Packages.
12. Any Website using PHP My SQL with Apache Web Server.

INSTRUCTIONAL STRATEGIES

Already available computers in the lab can be made dual bootable. Any flavor of linux can be downloaded from Internet and also LAMP technology software available on various websites like www.sourceforge.net. Teachers should use these software to teach the students.

RECOMMENDED BOOKS

1. www.sourceforge.net
2. UNIX for Programs, Graham Glow, PHI.
3. PHP and My SQL Bible
4. Open Source Technologies by Sugandhi Malhotra, Eagle Prakashan, Jalandhar.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1-2	6	35
3-4	14	35
5-6	12	30
Total	32	100

5.6 MINOR PROJECT WORK

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Minor project work aims at exposing the students to the various industries dealing with computers. It is expected from them to get acquainted with computer environment possess desired attitudes. For this purpose student during middle of the course are required to be sent for a period of two to four weeks at a stretch in different establishments. Depending upon the interest of students they are sent for exposure to:

- 1) Industrial practices in installation and maintenance of computers and computer networks
- 2) Fabrication of computers
- 3) Fault diagnosis and testing of computers
- 4) Industrial practices in respect of documentation and fabrication
- 5) A variety of computers and peripherals in assembly organizations
- 6) Software package development organizations
- 7) Maintenance of database
- 8) Write be stored procedure or functions which can be attached as the library objects to the main projects
- 9) Write a procedure function to convert number of words.
- 10) Write a procedure function to convert all data function (create your own) Database connectivity, (SQL server, Oracle, Access), Library classes in C++ (same application)., use of graphics in C++, Encryption decryption program, Active-X controls in VB.

Note: The teachers may guide /help students to identify their minor project work and chalk out their plan of action well in advance.

As a minor project activity each student is supposed to study the operations at site and prepare a detail project report of the observations/processes/activities by him/her. The students should be guided by the respective subject teachers; each teacher may guide a group of 4 to 5 students.

The teachers along with field supervisors/engineers will conduct performance assessment of students. Criteria for assessment will be as follows:

Sr No	Criteria	Weightage
1.	Attendance and Punctuality	15%
2.	Initiative in performing tasks/creating new things	30%
3.	Relation with people	15%
4.	Report Writing	40%

PERSONALITY DEVELOPMENT CAMP

This is to be organized at a stretch for two to three days during fifth or sixth semester. Extension Lectures by experts or teachers from the polytechnic will be delivered on the following broad topics. There will be no examination for this subject.

1. Communication Skills
2. Correspondence and job finding/applying/thanks and follow-up
3. Resume Writing
4. Interview Techniques: In-Person interviews; telephonic interviews, panel interviews; group interviews and video conferencing etc.
5. Presentation Techniques
6. Group Discussions Techniques
7. Aspects of Personality Development
8. Motivation
9. Leadership
10. Stress Management
11. Time Management
12. Interpersonal Relationship
13. Health and Hygiene