

6.1 TROUBLESHOOTING AND MAINTENANCE OF COMPUTERS

L T P
- - 4

RATIONALE

This subject gives the knowledge and competency too diagnose the faults for trouble shooting for systematic repair and maintenance of computers and computer peripherals.

DETAILED CONTENTS

1. Repair, Servicing and Maintenance Concepts

Introduction to servicing and maintenance concepts. Meantime between failure (NTBF) meantime the repair maintenance policy, potential problems preventive maintenance and corrective maintenance. Circuit tracing techniques. Concept of shielding grounding and power supply requirements and considerations of computers and its its peripherals.

2. Fundamental Trouble Shooting Procedures

- Fault location
- Fault finding aids
- Service Manuals
- Test and measuring instruments
- Special tools

3. Hardware and Software Faults

- Trouble shooting techniques. Different trouble shooting techniques and methods
- Functional area approach
- Split half method
- Divergent, convergent and feedback path circuits, analysis measured techniques.

4. Trouble shooting of computers, component and peripherals

- Mother Board
- FDD
- HDD
- CD ROM/DBD
- Printers
- Modems
- Monitors
- SMPs

5. Specification, Maintenance and Repair of CVTs and UPS
6. Environmental requirements of computer system and peripherals
7. Sight preparation and design of computer rooms. Testing specifications and installation of computer systems and peripherals.

INSTRUCTIONAL STRATEGY

While taking the theory classes, the teachers should lay emphasis on the practical aspects of trouble shooting and maintenance. As the given subject is based on hardware aspects of computer system, it needs lot of technical skills to study it thoroughly, field visit to maintenance repair and assembly centres will be beneficial to the students.

RECOMMENDED BOOKS

1. Electronic test equipment by RS Khandpur
2. Trouble shooting computer system by Robert C Benner
3. IBM PC and Clones Govinda Rajalu
4. Computer Maintenance and Repair – Scholi Muller
5. Upgrading your PC by Mark Minersi

6.2 COMPUTER GRAPHICS (Common with Information Technology)

L	T	P
2	-	3

RATIONALE

This subject will enable the students to have awareness about fundamental graphics which can be generated through computers using programming language C. He will be able to make picture and introduce motion in them using basic transformation.

DETAILED CONTENTS

1. Graphic Systems (6 hrs)
Display devices, physical input and output devices, display processors graphics software coordinate representation, graphics functions and standards.

- 2.. Scan conversion and Output Primitives (6 hrs)
 - Scan converting the point
 - Scan converting the straight line - Bresenham's line algorithm.
 - Scan converting a circle - Defining a circle
 - Bresenham's circle algorithm.
 - Region filling - introduction, flood filling, boundary filling
 - Side effects of scan conversion.

Graphic primitives in C, Point plotting, line drawing algorithms – DDA algorithms, Bresenham's line algorithms, circle-generating algorithms, ellipses

3. Two-Dimensional Transformations (6 hrs)
Basic transformations-translation, scaling, rotation, matrix representations and homogeneous coordinates, composite transformations – scaling relative to a fixed pivot, rotation about a pivot point, general transformation equations, other transformation – reflection.

4. Windowing and Clipping Techniques (6 hrs)
Windowing concepts clipping algorithms, area clipping, line clipping, polygon clipping, text clipping, blanking, window to-viewpoint transformation, Cohen Sutherland clipping algorithm.

5. Three Dimensional Graphics (4 hrs)
Three dimensional transformation, wire frame model, hidden line and hidden surface elimination

6. Perspective and Parallel transformations, vanishing points, perspective anomalies (4 hrs)

LIST OF PRACTICALS

Write programs for following:

1. To draw a line
2. To move a character about a line
3. To move two characters in. opposite direction.
4. To draw a circle
5. To move a character along circumference
6. To move along radius.
7. To use 2-d translation technique,
8. To use 2-d scaling technique
9. To use 2-d rotation technique.
10. To use 2-d reflection technique
11. Animation using corel move.

INSTRUCTIONAL STRATEGY

As the subject deals with Core Graphics Packages and techniques with vast applications in Medical Science, Animation Software, Image Processing, Compression techniques. Teacher is required to expose basic idea of graphics and implementation of various algorithms in C Programming language. The teacher should make the students to write the algorithm first and then based on those algorithms make them implement.

RECOMMENDED BOOKS

1. Principles of Interactive Computer Graphics by WM Newman and RF Spraul
2. Theory and problems of Computer Graphics by Roy A Plastock and Gordon Kalley. McGraw Hill Publishers, Schaum's Outline series.
3. Interactive Computer Graphics by Harengton
4. Computer Graphics Programming Approach by Steven Harrington
5. Computer Graphics by Donald Hearn and M Pauline Baker
6. Computer Graphics for Engineers by A Rajaraman, Narosa Publishing House Pvt Ltd Daryaganj, New Delhi 110002

6.3 MICROPROCESSORS – II

L T P
3 - 3

RATIONALE

The complex systems require high through put that at times is not met with 8-bit microprocessor system. So 16 bit microprocessors based system become suitable and economical they provide better facilities to personal computers and other industrial systems in variable use 16 bit microprocessor familiarization with the interfacing techniques will also achieves.

DETAILED CONTENTS

1. The microprocessor and its architecture (4 hrs)
Internal microprocessor architecture, real mode memory addressing "protected mode memory addressing, memory paging.
2. Addressing modes (6 hrs)
Data addressing models, program memory addressing modes, stack, memory addressing modes
3. 8086/8088 hardware specifications (6 hrs)
Pin puts and the pin functions, block diagram, bus buffering latching, bus firming, ready and the walf state minimum verses maximum mode.
4. 80286 microprocessor (4 hrs)
Pin_out & pin function, block diagram, hardware, hardware features.
5. The 80386 and 80486 microprocessors (8 hrs)
Block diagrams, hardware features, special control registers, 80486 6memory management, virtual 8086 mode. The memory paging mechanism
Introduction to 80486 microprocessor: Block diagram and hardware features, 80486 memory
System and memory management (8 hrs)
6. The 'Pentium and Pentium procedures microprocessor, introduction to Pentium microprocessor, memory system and I/O system, special Pentium register, sperscler architecture , Pentium memory management. Introduction to Pentium microprocessor

7. Bus interface: (6 hrs)
The ISA bus, The EISA bus and VESA local bus. The peripheral components of Pentium microprocessor
8. Memory Interface (6 hrs)
Memory devices, address decoding, 8088(8-bit) memory interface, 8086, 80286, 80386 SX(16-bit) memory interface, 80386 OX & '80486' (32-bit)' memory interface; Pentium &, Pentium pro (64-bit) memory interface

LIST OF PRACTICALS

1. Write programs for the following using 8086 instructions:
 - To add, subtract, multiply and divide 2,16 words in the memory locations.
 - To find average of n numbers
 - To find maximum and minimum of three numbers
 - To produced packed BCD from 2 ASCII characters
 - To move a string from one location to another in memory
 - To compare the strings
 - To convert BCD number into HEX number using stack
 - To find factorial for a number N.

RECOMMENDED BOOKS

1. Microprocessors and Interfacing Programming and applications - Douglas V Hall
2. The Intel microprocessors - Barry B. Brey
3. 8086 Programming & Architecture - Liu & Gibson. Prentice Hall of India, New Delhi
4. Microprocessors and Applications by B Ram.
5. Microprocessors and Applications by Uffenback
6. Microprocessors and Micro-controllers by BP Singh, Galgotia Publication, New Delhi

Elective-II
6.4 (a) NETWORK SECURITY
(Common with Information Technology)

L T P
3 - 4

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 (3 hrs)
Why Secure Network – Attackers Vs Hackers; attack from within and external
2. How Much Security (5 hrs)
Promoting Risk analysis; developing security policy – accessibility, defining security goals, justifying the policy, roles and responsibility, consequences of non-compliance, level of privacy
3. Firewalls (5 hrs)
Defining and access control policy, definition of firewalls and types, Firewalls (UNIX and NT), address translation, firewall logging, firewall deployment
4. Intrusion Detection System (IDS) (4 hrs)
IDS introduction; IDS limitations – teardrop attacks, counter measures; Host based IDS set up
5. Authentication and Encryption (10 hrs)
Authentication: Clear text transmission, session tracking; Encryption – methods, weaknesses, government interaction; Solutions – data encryption standards, digital certificate servers, IP security, Point to Point Tunneling Protocol (PPTP), RSA encryption, Secure Socket Layer (SSL), secure shell, Simple Key Management for IP (SKIP)
6. Visual Private Network (VPN) (6 hrs)
Basics, setting of VPN – proposing with firewalls, VPN diagram, configuration of required objects, exchanging keys, modifying security policy
7. Virus, Trojans and Worms (8 hrs)
What is Virus: replication, concealment, bomb, social engineering viruses; Worms; Trojan Horses; Preventive measures – Access Central, checksum verification, process neutering, virus scanners, neuristic scanners, application level virus scanners, deploying virus protection.

8. Disaster, Prevention and Recovery (8 hrs)
Disaster categories; network disasters – cabling, topology, single point of failure, save configuration files; server disasters – UPS, RAID, Clustering, Backups, server recovery, reluctant servers

LIST OF PRACTICALS

1. Installation of Anti-virus Package
2. Checking and removal of virus from the system
3. Expert lectures on Firewall
4. Expert lectures on Encryption, Decryption and Security Measures
5. Visit to higher organizations for the demonstration about Network security and exposure to software available

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 organised for students. The teachers should also be exposed in this area. Some practicals can be conducted in the laboratory.

RECOMMENDED BOOKS

1. Mastering Network Security by Christ Breton; BPB Publication, New Delhi
2. Web-sites by Chris Breton, BPB Publication, New Delhi
3. Network Firewalls by Kiranjeet Syan; New Rider Publication
4. Internet Security, New Rider Publication

Elective-II
6.4 (b) .NET
(Common with Information Technology)

L T P
3 - 4

RATIONALE

This is an upcoming technology, so the teacher should take pain in making the students conversant with this. The demonstration should be given using .NET software for describing the various features of .NET technology

DETAILED CONTENTS

1. .NET – evolution (3 hrs)
 Need and perspective in current scenario, .net framework over view structural diagram
2. .NET framework Base classes (3hrs)
 User and program interfaces, windows forms, web forms, console applications
3. XML (6 hrs)
 An overview of XML, use of XML, integrity of XML with databases, XML as the .NET Meta language
4. Visual Studio .NET (6 hrs)
 Common IDE for all languages, the common language specification, all .net languages, management of multiple language, projects
5. Language changes (6 hrs)
 Visual basic, C++, C#+, overview of C#, data types in C#, control flow in C#, C# classes
6. Anatomy of .NET Applications: (8 hrs)
 Assembly, module, type custom types, metadata and managed data
7. What is new in visual basic .NET ? (8 hrs)
8. What is new in visual studio .NET ? (8 hrs)

LIST OF PRACTICALS

1. Installation of .net
2. Exploring the various features of .net

3. Ability to work and start various tasks and features of .net framework
4. Able to work and develop program in Visual Basic.net
5. To explore in detail Visual Studio.net

INSTRUCTIONAL STRATEGY

.NET being a new technology subject, the teacher should lay considerable emphasis on giving various examples while imparting instructions to the students. Practice exercises will reinforce understanding of various features of this language and will develop requisite abilities to develop programs.

RECOMMENDED BOOKS

Introducing .NET by James Conard, Patrick Rengler, Birn Eranics, Jay Elynn Wron Publications

Elective-II
6.4 (c) VISUAL C++
(Common with Information Technology)

L T P
3 - 4

RATIONALE

Visual programming is the programming technique to make the task easy. This type of programming has become very helpful for designing widow based application. This subject will give the student in depth understanding of the function used in visual C++

DETAILED CONTENTS

1. Visual C++ (6 hrs)
 VC++ developer studio, VC++ Runtime library, VC++ MFC and template libraries, VC++ Building tool, Active X
2. C++ Classes (2 hrs)
 Class creation, accessing class members, encapsulation, constructor, destructors
3. Deriving C++ Classes (8 hrs)
 Class derivation, constructor for derived classes, creation of numbers of classes, managing classes, using class view, overloading operation, C++ template, exception handling in C++
4. Windows GUI programming with MFC library (8 hrs)
 Creation and building the programs, source code generation, building and running program, adding message handling function, adding menu commands, adding tool bar and status bar, scrolling and splitting views
5. Dialog Boxes (4 hrs)
 Dialog boxes, design of dialog boxes, creating classes to manage dialog boxes, defining message handler
6. Dialog Based Application (4 hrs)
 Creation of a simple dialog based application, multiple document interface

INSTRUCTIONAL STRATEGY

This subject is a practice based, so the emphasis may be given to practical exercises of visual C++ during the course of the study which in turn will reinforce the understanding of the subject.

RECOMMENDED BOOKS

1. Master Visual C++ by Michal J Young; BPB Publication, Delhi
2. Visual C++ by Davis Chapman, SAMS, Tech Media Publication, Delhi
3. Visual C++ Programming by Stene Holzmer; Pustak Mahal, IDG Books, Delhi

6.5 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

L T P
3 - -

RATIONALE

Entrepreneurship Development and Management is one of the core competencies of technical human resource. Creating awareness regarding entrepreneurial traits, entrepreneurial support system, opportunity identification, project report preparation and understanding of legal and managerial aspects can be helpful in motivating technical/ vocational stream students to start their own small scale business/enterprise. Based on the broad competencies listed above, following detailed contents are arrived to develop the stated competencies.

DETAILED CONTENTS

- | | | |
|-----|--|---------|
| (1) | Entrepreneurship | (4 hrs) |
| | 1.1 Concept/Meaning | |
| | 1.2 Need | |
| | 1.3 Competencies/qualities of an entrepreneur | |
| (2) | Entrepreneurial Support System | (6 hrs) |
| | 2.1 District Industry Centres (DICs) | |
| | 2.2 Commercial Banks | |
| | 2.3 State Financial Corporations | |
| | 2.4 Small Industries Service Institutes (SISIs), Small Industries Development Bank of India (SIDBI), National Bank for Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State level | |
| (3) | Market Survey and Opportunity Identification (Business Planning) | (6 hrs) |
| | 3.1 How to start a small scale industry | |
| | 3.2 Procedures for registration of small scale industry | |
| | 3.3 List of items reserved for exclusive manufacture in small scale industry | |
| | 3.4 Assessment of demand and supply in potential areas of growth | |
| | 3.5 Understanding business opportunity | |
| | 3.6 Considerations in product selection | |
| | 3.7 Data collection for setting up small ventures | |
| (4) | Project Report Preparation | (6 hrs) |
| | 4.1 Preliminary Project Report | |
| | 4.2 Techno-Economic feasibility report | |
| | 4.3 Project Viability | |

- (5) Managerial Aspects of Small Business (8 hrs)
- 5.1 Principles of Management (Definition, functions of management viz planning, organisation, coordination and control)
 - 5.2 Operational Aspects of Production
 - 5.3 Inventory Management
 - 5.4 Basic principles of financial management
 - 5.5 Marketing Techniques
 - 5.6 Personnel Management
 - 5.7 Importance of Communication in business
- (6) Legal Aspects of Small Business (6 hrs)
- 6.1 Elementary knowledge of Income Tax, Sales Tax, Patent Rules, Excise Rules
 - 6.2 Factory Act and Payment of Wages Act
- (7) Environmental considerations (6 hrs)
- 7.1 Concept of ecology and environment
 - 7.2 Factors contributing to Air, Water, Noise pollution
 - 7.3 Air, water and noise pollution standards and control
 - 7.4 Personal Protection Equipment (PPEs) for safety at work places
- (8) Miscellaneous (6 hrs)
- 8.1 Human relations and performance in organization
 - 8.2 Industrial Relations and Disputes
 - 8.3 Relations with subordinates, peers and superiors
 - 8.4 Motivation – Incentives, Rewards, Job Satisfaction
 - 8.5 Leadership
 - 8.6 Labour Welfare
 - 8.7 Workers participation in management
- (9) Motivation (4 hrs)
- 9.1 Factors determining motivation
 - 9.2 Characteristics of motivation
 - 9.3 Methods of improving motivation
 - 9.4 Incentives – pay, promotion, rewards
- (10) Leadership (2 hrs)
- 10.1 Need for leadership
 - 10.2 Functions of a leader
 - 10.3 Factors to be considered for accomplishing effective leadership

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
3. Environmental Engineering and Management by Suresh K Dhamija, SK Kataria and Sons, New Delhi
4. Environmental and Pollution Awareness by Sharma BR, Satya Prakashan , New Delhi
5. Thakur Kailash, Environmental Protection Law and policy in India: Deep and Deep Publications, New Delhi
6. Handbook of Small Scale Industry by PM Bhandari
7. Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi
8. Total Quality Management by Dr DD Sharma, Sultan Chand and Sons, New Delhi.
9. Principles of Management by Philip Kotler TEE Publication

6.6 MAJOR PROJECT WORK

L T P
- - 10

RATIONALE

Major 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:

- Installation of computer systems, peripherals and software
- Programming customer based applications
- Web page designing
- Database applications
- Networking
- Software Development
- Fabrication of components/equipment
- Fault-diagnosis and rectification of computer systems and peripherals
- Bringing improvements in the existing systems/equipment

A suggestive criteria 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.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations 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.