5.1 TROUBLE SHOOTING IN DIFFERENT CONSUMER APPLIANCES

L	T	P
2	-	4

RATIONALE

To understand Maintenance Concepts terminology and definitions, and corresponding numerical problems. To understand functioning (using block diagram) and method of setting up the frequently used T & M Instruments in the laboratory, their respective salient features and important technical specifications as also the terminology of measurement and its significance To understand functioning (using block diagram / construction diagram) and method of setting up the frequently used Home/Office Appliances and Power and Line Protection Devices. The complex systems require high through put that at times is not met with 8-bit microprocessor system. So, 16 bit up based system become suitable. They provide better facilities to personal computers and other automatic process control systems.

DETAILD CONTENT

1. a) Repair, Servicing and Maintenance Concepts (12 Periods)

Mean time between failures (MTBF), Mean time to repair (MTR), Maintenance policy, potential problems, preventive maintenance and corrective maintenance.

b) Fundamental Trouble Shooting Procedures

i) Fault location
ii) Fault finding aids
- Service manuals
- Test and measuring instruments
- Special tools

iii) Trouble Shooting Techniques
- Functional Areas Approach
- Split half method
- Divergent, convergent and feedback path circuit

2. Consumer Appliances- Principle, Working and troubleshooting with special emphasis on control panel (20 Periods)

a) Microwave Oven
b) Washing Machine
c) Photostat Machine
d) DTH System
e) Digital Camera

List of Practicals

Dismantling, assembly, testing, preparation of list of components, parts and their cost for:

1) Electric oven
2) Semi automatic & fully automatic washing machine
3) VCD / DVD / AVD players
4) Microwave Ovens
5) Photostate Machine

Recommended Books:

1. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting by R. G. Gupta Tata McGraw Hill Edition 2001
2. Student Reference Manual for Electronic Instrumentation Laboratories by Stanley Wolf, and Richard F.M. Smith, Prentice Hall of India Pvt. Ltd. New Delhi
3. Electronic Instrumentation and Measurement Techniques by WD Cooper, AD Helfrick, Prentice Hall of India Pvt. Ltd. New Delhi
4. Digital Instrumentation A. J. Bouwens, Tata McGraw Hill
5. Consumer Electronics by S. P. Bali, Pearson
6. Modern Electronic Equipment: Troubleshooting, Repair and Maintenance by Khandpur, TMH
7. Electronic Testing and Fault Diagnosis by G. C. Loveday, A. H. Wheeler Publishing

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for Lecturers and Tutorials (Period)	Marks Allotted
1.	12	20
2.	20	30
TOTAL	32	50

5.2MOBILE COMMUNICATION & REPAIR OF CELLULAR PHONE

L	T	P
5	-	4

RATIONALE

The Wireless /mobile communication is spreading at a very fast rate . It is expected that with in short period nearly everybody is using mobile communication .Hence students should know the functioning of wireless /mobile system/ equipmemt to keep themselves abreast of this latest application of communication.

DETAILED CONTENTS

1. **Wireless communication** **(06Periods)**
   - 1.1 Basics
   - 1.2 Advantages Of wireless communication

2. **Mobile communication** **(06Periods)**
   - 2..1 Evolution of Mobile Radio Communication
   - 2..2 Mobile Radio System around the world
   - 2.3 Examples of wireless communication system
   - 2.3.1 Paging system
   - 2.3.2 Cordless Telephone System
   - 2.3.3 Cellular telephone system

3. **Cellular Concept:** **(10 Periods)**
   - 3.1 Cell area
   - 3.2 Capacity of cell
   - 3.3 Improving coverage and capacity in cellular system
   - 3.3.1 Cell Splitting
   - 3.3.2 Sectoring
   - 3.3.3 Repeater for Range extension

4. **Mobile Communication Systems – Introduction of:** **(08 Periods)**
   - 4.1 Advance Mobile Phone Systems(AMPS)
   - 4.2 Operation of AMPS
   - 4.3 Working of AMPS Phone System
   - 4.4 Global Systems for Mobile Communication(GSM)
   - 4.5 GPRS, GPS, Globle positioning systems

5. **Electrical and personal safety, dangers and preventions** **(12 Periods)**

   Introduction to various types of mobile handsets, their description, features & how to use these features. Identify the keys and their uses.

   Explaining of various features of mobile phones and methods of using the same.

6. Fault finding and trouble shooting (12 Periods)

Identify the components used in a cell phone
Function of Mic, speaker and vibrator
SMD soldering methods
Identify BGA Ics.
Identify various blocks and their functions

7. Use of various solders , flux and cleaning agents. (12 Periods)

Use of antenna and antenna switch
Functions of display, CPU, memory
Various locks used in cell phone

8. Functions of the IF section, COBBA section and PA section. Complete knowledge of Block Diagram, (14 Periods)

circuit diagram, i.e.,
Power Section
On/off circuit
Net Section
Charging Section
Software Section
SIM and SIM related problems of GSM & CDMA PHONES
Use of computer for cell phone servicing – cell phone software
Camera phones its constructional details and working Bluetooth and other wireless circuits.
Flashing and its need- precautions to be taken while flashing
Knowledge of downloading of add-on software, ring tones wall papers themes etc on non-multimedia and multimedia handsets, window based handsets.

List of Practicals

1. Practice procedures for safety and health hazards measures
2. Operation and setting of cell phone
3. Identify various components of mobile handsets
4. Replace faulty parts with new parts of mobile phone that can be done without use of soldering
5. Test the battery and battery charger with multimeter
6. Testing of Mic, speaker and vibrator
7. Soldering and desoldering of various SMD components and select suitable temperature for use.
8. Soldering and desoldering of BGA Ics.
9. Check track continuity and use jumpers for track problems
10. Apply proper flux and cleaning the cell phone
11. Test and rectify the problems in antenna and antenna switch
12. Identify the fault and test the display interface circuits.
13. Identify the faults of Network section and voice section and rectify them
14. Rectify the faults in Camera and camera interface circuits
15. Identify and Rectify the faults in Bluetooth circuits Use of anti-static mats
16. Complete hardware and software knowledge of PDA and multimedia handsets, Window based handsets.

RECOMMENDED BOOKS

1. Wireless Communications (Priciples and Practice), by Thedore S.Rappapoirt.
2. Introdoction to Wireless and Mobile Systems, by Dharma Prakash Agarwal, Qing-An zeng.
3. Wireless Communications and Networking, by William Stallings.
4. Mobile and Personal Communication Systems and Services, by Raj Pandya,Prentice Hall of India, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for Lecturers and Tutorials (Period)	Marks Allotted
3.	**06**	**03**
4.	**06**	**05**
5.	**10**	**06**
6.	**08**	**06**
7.	**12**	**08**
8.	**12**	**08**
9.	**12**	**08**
10.	**14**	**08**
TOTAL	**80**	**50**

5.3 MICROPROCESSOR AND ITS APPLICATIONS

L	T	P
4	-	3

RATIONALE

The study of microprocessors in terms of architecture, software and interfacing techniques leads to the understanding of working of CPU in a microcomputer. The development in microprocessors of 32 bit architecture brings them face-to-face with mainframe finding employment in R&D, assembly, repair and maintenance of hardware of microprocessors and computers. Microprocessors find application in process control industry. They also form a part of the electronic switching system between source and destination in long distance telecommunications. Thus the microprocessor is an area of specialization. Students of electronics and related engineering branches often use microprocessors to introduce programmable control in their projects, in industrial training.

DETAILED CONTENTS

1. **Evolution and Architecture of a Microprocessor (With reference to 8085 microprocessor) (12 periods)**

   Typical organization of a microcomputer system and functions of its various blocks. Concept of Bus, bus organization of 8085, Functional block diagram of 8085 and function of each block, Pin details of 8085 and related signals, Demultiplexing of address/data bus generation of read/write control signals, Steps to execute a stored programme

2. **Programming (with respect to 8085 microprocessor) (16 periods)**

   Brief idea of machine and assembly languages, Machines and Mnemonic codes, Instruction format and addressing mode. Identification of instructions as to which addressing mode they belong. Concept of Instruction set. Explanation of the instructions of the following groups of instruction set. Data transfer group, Arithmetic Group, Logic Group, Stack, I/O and Machine Control Group. Programming exercises in assembly language. (Examples can be taken from the list of experiments)

3. **Memories and I/O interfacing (12 Periods)**

   Memory organization, Concept of memory mapping, partitioning of total memory space. Address decoding, concept of I/O mapped I/O and memory mapped I/O. Interfacing of memory mapped I/O devices. Concept of stack and its function. Basic RAM Cell, N X M bit RAM, Expansion of word length and capacity, static and dynamic RAM

4. **Interrupts (08 Periods)**

   Concept of interrupt, Maskable and non-maskable, Edge triggered and level triggered interrupts, Software interrupt, Restart interrupts and its use, Various hardware interrupts of 8085, Servicing interrupts, extending interrupt system

5. **Data transfer techniques (08 Periods)**

   Concept of programmed I/O operations, sync data transfer, async data transfer (hand shaking), Interrupt driven data transfer, DMA, Serial output data, Serial input data

6. **Peripheral devices (08 Periods)**

   8255 PPI and 8253 PIT, 8257 DMA controller, 8279 Programmable KB/Display Interface, 8251 Communication Interface Adapter, 8155/8156

LIST OF PRACTICALS

1. Familiarization of different keys of 8085 microprocessor kit and its memory map
2. Steps to enter, modify data/program and to execute a programme on 8085 kit
3. Writing and execution of ALP for addition and substation of two 8 bit numbers
4. Writing and execution of ALP for multiplication and division of two 8 bit numbers
5. Writing and execution of ALP for arranging 10 numbers in ascending/descending order
6. Writing and execution of ALP for 0 to 9 BCD counters (up/down counter according to choice stored in memory)
7. Interfacing exercise on 8255 like LED display control

INSTRUCTIONAL STRATEGY

The digital systems in microprocessors have significant importance in the area of electronics. Adequate competency needs to be developed by giving sufficient practical knowledge in microprocessors (programming as well as interfacing). Help may be taken in the form of charts, simulation packages to develop clear concepts of the subject. Programming exercises other than the given in the list may be given to the students.

RECOMMENDED BOOKS

1. Microprocessor Architecture, Programming and Applications with 8080/8085 by Ramesh S Gaonker, Willey Eastern Ltd. New Delhi
2. Introduction to Microprocessor by Mathur ,Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Microprocessor and Microcontrollers by Dr B P Singh, Galgotia Publications, New Delhi
4. Microprocessor and Applications by Badri Ram: Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Microprocessor and Microcomputers by Refiquzzaman, Prentice Hall of India Ltd., New Delhi
6. Digital Logic and Computer Design by Mano, M Morris; Prentice Hall of India, New Delhi
7. Digital Electronics and Applications by Malvino Leach; Publishers McGraw Hill, New Delhi
8. Digital Integrated Electronics by Herbert Taub and DonalsSachilling; Prentice Hall of India Ltd., New Delhi
9. Digital Electronics by Rajaraman; Prentice Hall of India Ltd., New Delhi
10. Digital Electronics and Microprocessor by Rajiv Sapra, Ishan Publication, Ambala

S SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for (Practical Period)	Marks Allotted
1.	12	10
2.	16	15
3.	12	10
4.	08	05
5.	08	05
6.	08	05
TOTAL	**64**	**50**

5.4 INDUSTRIAL ECONOMICS AND PRINCIPLES OF MANAGEMENT

L	T	P
4	-	-

DETAILED CONTENTS

1. Nature and significance of Economics. Meaning of Science, Engineering and Technology and their relationship with economic development. **(16 Periods)**

2. The concept of demand and supply. Elasticity of Demand and Supply. Indifference Curve Analysis, Price Effect, Income Effect and Substitution Effect. **(14 Periods)**

3. Money and Banking: Functions of Money, Value of Money, Inflation and measures to control it. Brief idea of functions of banking system, viz., Commercial and central banking, Business fluctuations. **(14 Periods)**

4. Nature and Significance of Management. Evaluation of Management thought, Contributions of Max Weber, Taylor and Fayola. **(10 Periods)**

5. Human Behavior: Factors of Individual Behavior, Perception, Learning and Personality Development, Interpersonal Relationship and Group Behavior. **(10 Periods)**

Text Books:

1. Dewett, K.K., "*Modern Economic Theory*S.Chand & Co.
2. Luthers Fred "*Organizational Behaviour*",
3. Industrial Management - S C Jain, W S Bawa, Dhanpat Rai & Co. (P) Ltd.
4. Industrial Management, Vol.1 L.C. Jhamb, EPH,
5. Industrial Engineering & Production Management - Martand Telsang, S. Chand
6. Industrial & Business Management - Martand T. Telsang, S. Cha

.**Reference Books:**

1. Prasad L.M "*Principles of Management*",.
2. Stonier A.W. & D.C. Horgne, "*A Text Book of Economic Theory*", Oxford Publishing House Pvt. Ltd.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for Lecturers and Tutorials (Period)	Marks Allotted
1.	16	18
2.	14	15
3.	14	15
4.	10	14
5.	10	12
TOTAL	**64**	**75**

5.5 INSTALLATION REPAIR & MAINTENANCE OF EPBAX SYSTEM

L	T	P
5	-	4

DETAILED CONTENTS

1. Basic Communication System (05 Periods)

Basic block diagram of digital and data communication systems. Their comparison with analog communication systems. Basic information theory.

2. Digital Modulation Technique (10 Periods)

– Basic block diagram and principle of working of the following:
- Amplitude shift keying (ASK): Interrupted continuous wave (ICW), two tone modulation
- Frequency Shift keying (FSK)
- Phase shift keying (PSK),
- Quadrature Amplitude modulation (QAM)

3. Modems (10 Periods)

Need and function of modems, Mode of modems operation (low speed, medium speed and high speed modems). Modem interconnection, Modem data transmission speed, Modem modulation method, Modem interfacing (RS 232 Interface, other interfaces).

4. Push button Telephones (20 Periods)

Basic Block Diagram of a Telephone
Function Of Each Block
Various Tones Used In The Phone Circuits
Use Of Microphone And Speaker
Pulse Dialing And Tone Dialing And Their Applications
Function Of Dialer Circuit,Speech Circuit,Ringer Circuit,Protection Circuit,
Function & Working Of Key Pad Used In Pushbutton Telephone
Testing Methods Of Pushbutton Telephone For Proper Functions
Use Of Various Adaptors, Connectors And Sockets Used In The Telephone Circuits
Trouble shooting and corrective maintenance

5. Electronic Exchange (10 Periods)

- Typical telephone network. Various switching offices (Regional Centre, District Centre, Toll Centre, Local Office) and their hierarchy.
- Principles of space division switches. Basic block diagram of a electronic exchange and it's working.
- Basic idea of FAX system and its applications. Basic Principle of operation and block diagram of modern FAX system. Important features of modern FAX machines.
  Trouble shooting and corrective maintenance

6. EPABX systems (15 Periods)

Basic Block Diagram of EPABX System
Different Types of EPABX System
Methods To Connect The Trunk Line And Extension Line in a EPABXX
Different Facilities Available In Epabx System Eg Call Waiting, Call Transfer, Conference Facility
Wiring Circuits And Understand The Wiring Of Extension Circuits

Trouble shooting and corrective maintenance

7. Digital Exchange (10 Periods)

Working Principle and operation of digital exchange, Trouble shooting and corrective maintenance

List of Practicals

1 Familarisation Of Tools & Instruments Used For Wiring And Testing Of Epabx System
2 Identify & Test The Components Used In The Pushbutton Telephone
3 Identify The Various Tone Signals Used In The Phones
4 Testing Of Microphone And Speaker
5 Testing & Replacing Components In The Protection Circuit And Ringer Circuit
6 Testing Of Key Pad For Proper Function And Repair The Key Pad Problems
7 Identify The Faulty Component And Replace In The Dialer Circuit And Speech Circuit
8 Test And Identify The Fault In A Pushbutton Telephone
9 Identify And Fix The Various Adaptors, Connectors And Sockets
10 Identify The Terminals Of Trunk Line And Extension Line And Connect The Extensions
11 Setting The Call Transfer, Call Wait And Other Facilities Available On Epabx
12. Trace The Wiring And Locate The Fault In The Extension Wiring Circuit
13. Trouble Shooting And Maintenance Practices Of Epabx, Electronics And Digital Exchange

RECOMMENDED BOOKS

1.Electronic Communication Systems By George Kennedy Tata McGraw Hill Education PvtLtd, New Delhi
2.Communication system By A.K. Gautam S.K. Kataria Sons, Delhi
3.Electronics communication by K.S. Jamwal, Dhanpat Rai and Sons, Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for Lecturers and Tutorials (Period)	Marks Allotted
1.	05	02
2.	10	05
3.	10	05
4.	20	15
5.	10	05
6.	15	10
7.	10	08
TOTAL	80	50