MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME : ELECTRONICS ENGINEERING GROUP

COURSE CODE : EJ/ET/EX/EN/ED/EI/DE

DURATION OF COURSE : 6 SEMESTERS for ET/EN/EX/EJ/DE and 8 SEMESTERS for ED/EI **WITH EFFECT FROM 2012-13**

SEMESTER : FIFTH **DURATION : 16 WEEKS**

FULL TIME / PART TIME : FULL TIME **SCHEME : G**

SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME								SW (17500)
							PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)		
				TH	TU	PR		Max	Min	Max	Min	Max	Min	Max	Min	
1	Computer Hardware & Networking β	CHN	17533	02	--	02	02	50	20	--	--	--	--	25@	10	50
2	Microcontroller β	MIC	17534	03	--	02	03	100	40	50#	20			25@	10	
3	Digital Communication	DCO	17535	03	--	02	03	100	40	50#	20	--	--	25@	10	
4	Control System & PLC	CSP	17536	03	--	02	03	100	40	50#	20	--	--	25@	10	
5	Audio Video Engineering	AVE	17537	03	--	02	03	100	40	--	--	--	--	25@	10	
6	Behavioural Science $	BSC	17075	01	--	02	--	--	--	--	--	25#	10	25@	10	
7	EDP & Project β	EDP	17066	01	--	02	--	--	--	--	--	--	--	25@	10	
8	Professional Practices-III	PPT	17067	--	--	03	--	--	--	--	--	--	--	50@	20	
	TOTAL			**16**	**--**	**17**	**--**	**450**	**--**	**150**	**--**	**25**	**--**	**225**	**--**	**50**

Student Contact Hours Per Week: **33 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks **: 900**

@- Internal Assessment, # - External Assessment, [ ] No Theory Examination, $ - Common to all branches, #* - Online Theory Examination,

β - Common to IE / IS / IC / DE / EV / IU / EL / MU

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term Work, SW- Sessional Work.

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms.
- Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.

Course Name : Electronics Engineering Group

Course Code : ET/EN/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI

Semester : Fifth for ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU and Sixth for IU/ED/EI

Subject Title : Computer Hardware and Networking

Subject Code : 17533

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	--	02	02	50	--	--	25@	75

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

Today is the age of information technology. Hence everyone is required to work on computers and internet. This subject is introduced to focus on basic working of the computer motherboard, peripherals and networking components.

Theoretical and Practical approach while studying this subject will help in understanding for troubleshooting, diagnosing computer and its peripheral related problems. Students will aware of basic concept of networking, its applications, topologies, communication media, network directing devices, protocol used, OSI reference model and TCP/IP model.

This subject will give exposure to students on computer hardware, peripherals, specifications, installation, faults and troubleshooting. Students will also be able to plan, analyze, design, install, configure, test, implement and maintain networking systems

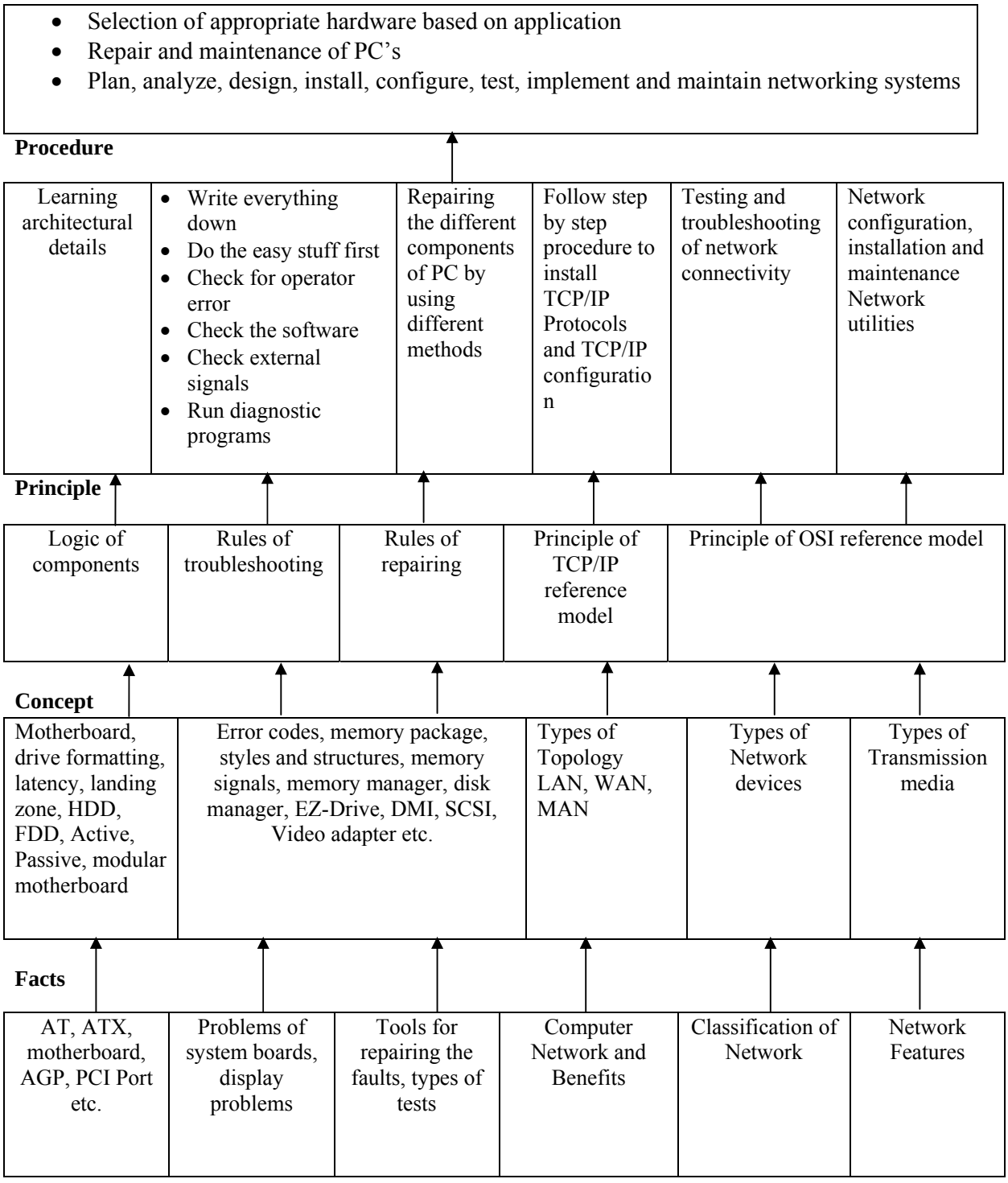
Study of this subject will enable students to select appropriate hardware, list specifications, will identify simple to complex problems and their solutions. The subject is practical oriented and will develop the debugging skills in the students

General Objectives.

Students will able to.

- Understand principle, construction, working of computer peripherals
- Select cost effective, good quality reliable peripherals and equipment
- Identify the problem as hardware or software related.
- Identify and repair the simple faults in computer systems.
- Plan, analyze, design, install, configure, test, implement and maintain networking systems

Learning Structure



Theory:

Chapter	Topic and Contents	Hours	Marks
01	**Topic 1] Motherboard and Peripherals** **Specific Objectives:** ➢ **Identify different components and their function on motherboard** ➢ **Identify and compare storage devices** ➢ **Write specifications, select appropriate monitor and compare LCD and CRT monitors** ➢ **Understand principle, construction and working of peripherals** **Contents:** • Different types of PC configurations and their comparison, • Chipset basic, Architecture of Intel 945 G • Overview and features of ISA, PCI-X, PCI-Xpress • Overview features and types of DDR RAMs, Concept of cache memory : Internal cache, External cache (L1, L2, L3 cache), BIOS Basics • CD/DVD ROM drive : Construction, recording, comparison • LCD monitor: functional block diagram of LCD monitor, working principle, Types-Passive matrix and Active matrix. Important characteristics - Resolution, Refresh rate, Response time. Comparison of CRT display and LCD display • Construction, working & Installation of Keyboard, mouse, scanner and printer. Keyboard: Membrane and mechanical only. Mouse: Optical only, Scanner: Flatbed only, Printer: Dot matrix, Inkjet, and Laser only	10	14
02	**Topic 2] Power Supply and Interfaces** **Specific Objectives:** ➢ **Select, identify, measure and troubleshoot power related problems** ➢ **Differentiate online and offline UPS.** ➢ **Identify, select and use different interfaces** **Contents:** 2.1 • Block diagram and working of SMPS, Signal description and pin diagram of ATX power supply. • UPS : Block diagram working, Types, Rating 2.2 • USB features and operation, RS232: Voltages & 9 pin Signal description.	04	06
03	**Topic 3] Diagnostic, Testing and Maintenance** **Specific Objectives:** ➢ **Identify importance of preventive maintenance** ➢ **Realize the need of practices of preventive maintenance of peripheral** **Contents:** • Maintenance : Preventive and passive maintenance • Preventive maintenance of peripherals of PCs: Mouse, keyboard, hard disk, CDROM drive, laser printer, scanner.	04	08

	• PC problems and troubleshooting, POST.		
04	**Topic 4] Introduction to Networks** **Specific Objectives:** ➢ **Classify types of networks** ➢ **Plan and design network** ➢ **Install, configure and use networking devices** ➢ **Test and maintain networks** **Contents:** • Network classification: LAN, WAN, MAN. Peer to peer and client server networks • Network topology, Benefits of networks • Network cables- coaxial, UTP, STP, fiber optics their comparison and characteristics • Network standards- Ethernet, Ring, Token, wireless • Principle, operation and function of Hubs, Switches, Routers, Bridges, Repeaters, Gateways, firewalls	06	10
05	**Topic 5] Networking Devices and Reference Models** **Specific Objectives:** ➢ **Understand layered approach** ➢ **Compare TCP-IP and OSI models** ➢ **Setup and configure network in laboratory environment** **Contents:** • OSI Reference Model - Interlayer Communication - Data Encapsulation, Functions of each layer. • TCP/IP Reference Model - Link, Internet, Transport, Application layer. • Comparison of the OSI and TCP/IP reference models • TCP/IP Protocols - IP, ICMP, ARP, TCP, FTP and UDP. • IP Addressing - IP Address Assignments, IP Address Classes, Subnet Masking. • TCP/IP Configuration - Installing the TCP/IP Protocol; Configuring TCP/IP - Configuring Basic TCP/IP Properties, Configuring Advanced TCP/IP Properties	08	12
	Total	**32**	**50**

Skills to be developed:
Intellectual Skills:

1. Identify and select appropriate peripherals
2. Plan schedule for preventive maintenance of computer systems and network
3. Test and troubleshoot the problems in computer systems
4. Plan, analyze, design, configure networking systems
5. Select different hardware and software diagnostic tools of networking.

Motor Skills:

1. Handling of computer system and peripherals
2. Assembly of computer systems

3. Install and testing of network components
4. Crimping of cables.

Practical: **List of experiments**

1. **Computer System:** Show different types cabinets and motherboards to students. Identify CPU types, motherboard architecture, form factor, chipsets used, RAM slots, different types of buses, on board peripherals, different connectors like sata/pata, ATX/AT, FDD, and other connections terminated at front or rear panels. CMOS battery, BIOS type, jumper settings. List the standard specifications of latest PC.
2. **Keyboard:** Identify different types of keyboards, types of keys, number of keys, different type of keyboard connectors, there details, Keyboard installation, wireless keyboard, typical keyboard errors and troubleshooting procedures of it, Guidelines for preventive maintenance of keyboards
   Mouse: Identify different types of mouse, dissemble mouse, and show different parts / mechanisms of mouse, principle of operation, connectors of mouse, wireless mouse, typical mouse faults and trouble shoot procedure of it. Guidelines for preventive maintenance of mouse
3. **Hard Disk:** Identify different types of hard disk, classify them into PATA and SATA, Open hard disk show different parts of hard disk, identify pins and connectors of HDD, How to make HDD primary/secondary i.e. jumper settings of IDE disk, SCSI hard disk and its controller card. Explain terms related to Hard Disk : Track, Sector, cylinder, cluster, Head parking, MBR, Zone recording.
4. **Formatting and Partitioning of Hard disk:** Low level and high level formatting of hard disk, partitioning of hard disk into different logical drives using fdisk or similar third party utilities. Install multiple Operating systems on same hard disk. Identify different errors, Standard procedures to troubleshoot hard disk
5. **Display Adapter:** Identify display adapters and its types. Identification of appropriate drivers of connected display device. Installation of display drivers, setting resolutions, factory settings, different controls on front panel of monitor. Types of monitors, there comparison, typical faults of monitor, Troubleshooting procedure of monitors
6. **Scanner:** Identify different types of scanners, principle of operation, typical specifications, installing scanner, scanning of images, typical faults of scanner and trouble shoot procedure of it. Preventive maintenance of scanner.
7. **Modem:** Identify different types of modem, installation of modem, modem operations, different types of indicators on front panel of external modem and there meanings, modem connectors, Typical faults and maintenance of modem
8. **Power Supply:** ATX power supply, pin details, voltage measurement, typical faults and troubleshooting procedure of SMPS, Preventive maintenance.
9. **Printer:** Identify printers, typical components of each printer, printer specifications, printer installation of local and network printers. Typical faults of printer and trouble shoot procedure of it. Guide lines for preventive maintenance of printer.
10. **Network Cables:** Identify different types of network cables, comparison , prepare straight and cross cable by crimping and test the same with network tester.
11. **Setup of client server network in a Lab:** Connect one computer lab in client server configuration using hub/ switch, UTP cables, RJ-45 connectors. Install network cards, Test them, set IP addresses in class-c network, test connectivity of clients to server using software utilities, demonstrate client server based application

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher
01	Mark Minasi	The Complete PC Upgrade & Maintenance Guide	Willey Publication
02	Scott Mueller	Upgrading & Repairing PCs	Pearson Education
03	Bigelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
04	William Stalling	Local and metropolitan Area Networks 6/e	Pearson
05	Douglas E Comer & M S Narayanan	Computer Networks and Internet	Pearson

Websites:

1. ccna.com
2. ccna.com/ccna-training
3. learningnetwork.cisco.com
4. www.mcse-training.com
5. www.microsoft.com/learning/en/us/certification/mcse.aspx
6. www.intel.com/products/processor
7. www.intel.com/products/desktop/motherboard
8. www.seagate.com
9. www.scsisource.com
10. www.w3schools.com/tcpip
11. www.protocols.com

Course Name : Electronics Engineering Group

Course Code : ET/EN/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI

Semester : Fifth for ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU and Sixth for IU/ED/EI

Subject Title : Microcontroller

Subject Code : 17534

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50#	--	25@	175

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

This subject comes under technology area. The subject is an extension of concepts covered in digital technique. 8051 microcontroller architecture, peripheral interfacing to it, assembly language programming is covered in this subject.

Microcontroller is heart of all domestic, industrial, consumer goods and other high end products. Automation in every field of life is being used and microcontroller is inbuilt element of these systems and devices.

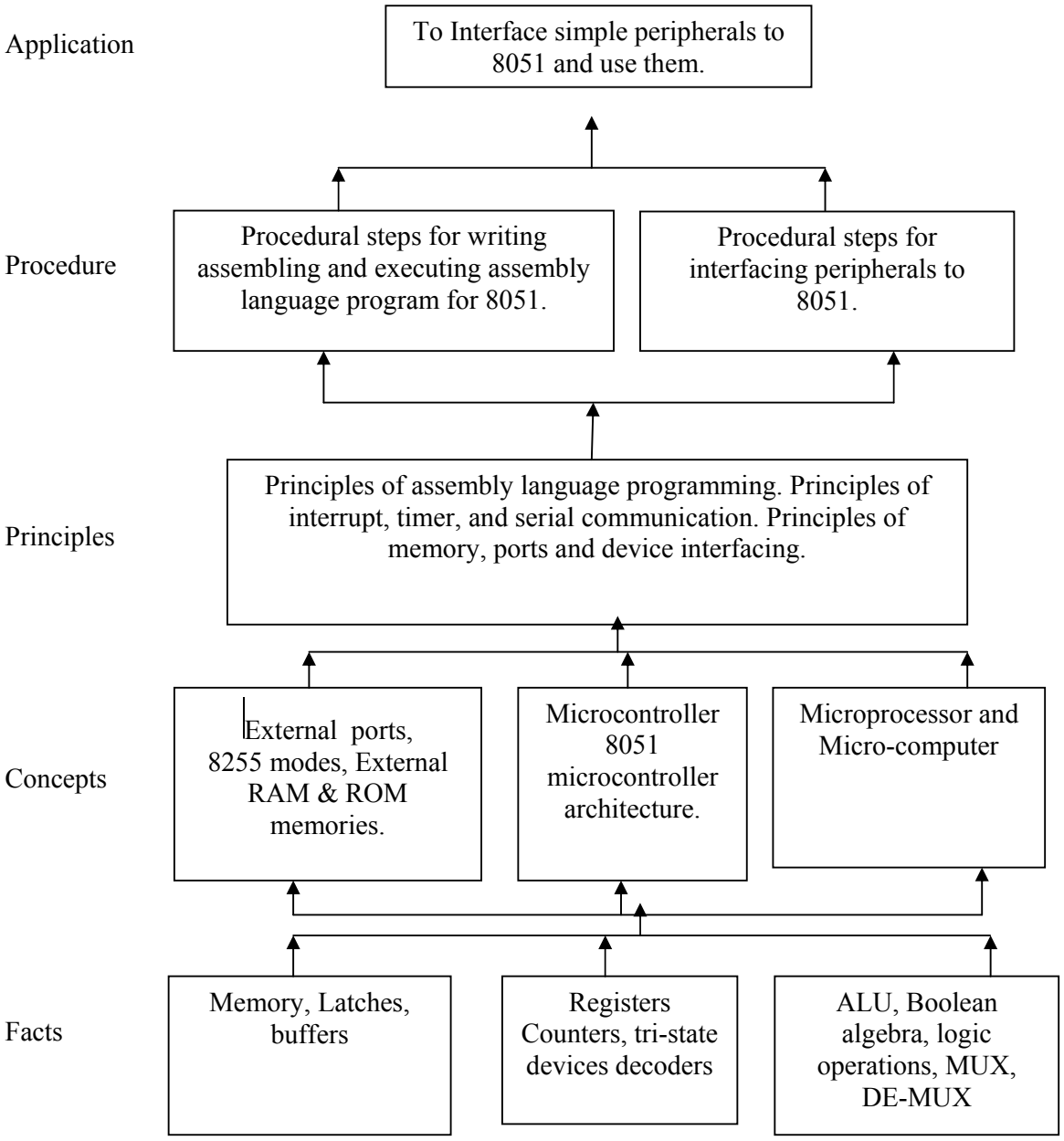
The student will gain the knowledge of peripheral interfacing and programming them. Microcontroller is in built element of embedded system. The subject will help the students to study concepts of embedded system. It will also help to understand design of simple microcontroller systems.

General Objectives.

Students will able to:

- Understand concepts of microcomputer, microprocessor and microcontroller.
- Interface peripherals to microcontroller.
- Develop logic for assembly language programming.
- Understand the principles of working of present day microcontroller systems in various fields.

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
Topic 1: Introduction to Microcomputers and Microcontrollers **Specific Objectives:** ➢ Distinguish microcomputer, microprocessor, and microcontroller **Contents:** 1.1 Introduction to single board microcomputer. (Marks 04) • Block Diagram of Microcomputer. • Elements of Microcomputer. (Buses, Microprocessor, memory, I/O devices). • Different types of buses: address, Data, and control bus 1.2 Introduction to Microcontroller (Marks 06) • General block diagram of microprocessor and microcontroller • Comparison of Microprocessors and Microcontrollers. • Types of architectures - Harvard and Von-neuman. • Selection factors of microcontroller(Architecture type, speed, Word size, instruction set, memory, and I/O capability)	04	10
Topic 2: 8051 Microcontroller ➢ Identify Hardware features and internal registers with their functions ➢ Identify physical difference between external and internal memory and between different ports ➢ Compare different members of 8051 family. **Contents :** 2.1 8051 architecture (Marks 10) • Features, Architecture, Pin description. 2.2 Special Features of 8051 (Marks 06) • Boolean Processor, Power saving options- idle and power down mode, Derivatives of 8051.	08	16
Topic 3: 8051 Instruction set and programming ➢ Comprehend addressing modes and instruction set. ➢ Develop and realize assembly language programs. 3.1 Addressing modes and instruction set. (Marks 10) • Assembler directive- ORG, DB, EQU, END, CODE, DATA 3.3 Assembly language programming (Marks 10) 3.4 Software development cycle- Editor, Assembler, cross compiler, linker, locater, compiler (Marks 04)	12	24

Topic 4: MCS 51 Interrupt and timers ➢ Realize Concept of Interrupts, timer, and related SFRs ➢ Use timers and Interrupts through programs ➢ Compare interrupts and polling method. **Contents:** 4.1 8051 Timer/counter (Marks 12) • Timer / Counter logic and modes • Simple programs on timer to generate time delay using polling and interrupt method. 4.2 8051 Interrupts (Marks 10) • Interrupts and polling. • SFR - IE, IP • Simple programs based on interrupts and polling method	10	22
Topic 5: Serial Communication and parallel ports: ➢ Comprehend Serial and parallel communication **Contents:** 5.1 Serial port of 8051 • Serial Communication-SCON, SBUF • Modes of serial communication • Simple programs for serial communication. • I/O port structure & its Programming.	06	12
Topic 6: Memory and I/O interfacing ➢ Interface I/O devices and memory devices ➢ Expand memory and I/O **Contents:** 6.1 Memory Interfacing: (Marks 06) • Interfacing External RAM and ROM 6.2 I/O Interfacing: (Marks 10) • 8255-Block diagram, operating modes • Port expansion with 8255 • Interfacing of LED, keys, Relays, Seven segment display, Stepper motor.	08	16
Total	**48**	**100**

Practical's:
Skills to be developed:

Intellectual skill

1. Understand hardware and instruction set.
2. Develop assembly programs.

Motors skills

1. Handle trainer kits, computer.
2. Interface peripherals.

List of practicals:

1. Know 8051 kit and simulation software in your lab.
2. Develop program for arithmetic operation such as addition, subtraction multiplication, division.
3. Develop program for block exchange and block transfer with external memory.

4. To develop program for finding smallest/largest number and arranging numbers in ascending/descending order.
5. Generate square wave and rectangular wave on port pin with a program.
6. Interface LED and key with 8051 and making LED on/off with a key press.
7. Interface 7-segment display and design up/down counter on it with a program.
8. Display of key depression in decimal format on 7- segment display using lookup table through program.
9. Interface 8 bit DAC to generate different patterns and interface 8 bit ADC and develop program to convert analog data and store it.
10. Develop program for level controller/Traffic Controller.

Learning resources:

1. **Books**

Sr. No.	Title	Author	Publisher
01	8051 Microcontroller architecture programming & application.	K. J. Ayala	EEE/ Prentice Hall of India
02	The 8051 microcontroller & embedded system.	Mohmad-ali-mazidi, Janice-Gelispe-mazidi , Roline D. Mckinlay	Pearson / Prentice hall
03	Microcontroller principal & application	Ajit Pal	Prentice Hall of India
04	Microcontroller theory & application.	Ajay Deshmukh	Tata McGraw- Hill
05	Microcontroller Architecture, programming, interfacing, & system design	Rajkamal	Pearson
06	8051 Microcontroller Mcs-51 family and its variant.	Satish shaha	Oxford

2. **C.D's / PPT's** : www.osvn.com

3. **Websites:**
   www.youtubecom
   www.keil.com
   www.faqs.org/microcontroller

Course Name : Electronics Engineering Group

Course Code : EJ/EX/ET/EN/DE/EV/ED/EI

Semester : Fifth for EJ/EX/ET/EN/DE/EV and Sixth for ED/EI

Subject Title : Digital Communication

Subject Code : 17535

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50#	--	25@	175

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

"Digital communication" is a Core subject for the Electronics & Communication engineering student. Communication technologies have undergone radical changes, especially due to convergence of computers and communication. Digital communication offers data processing option and flexibility which is not available with analog communication. This subject will enable the student to comprehend facts, concept and working principles of Digital communication systems.

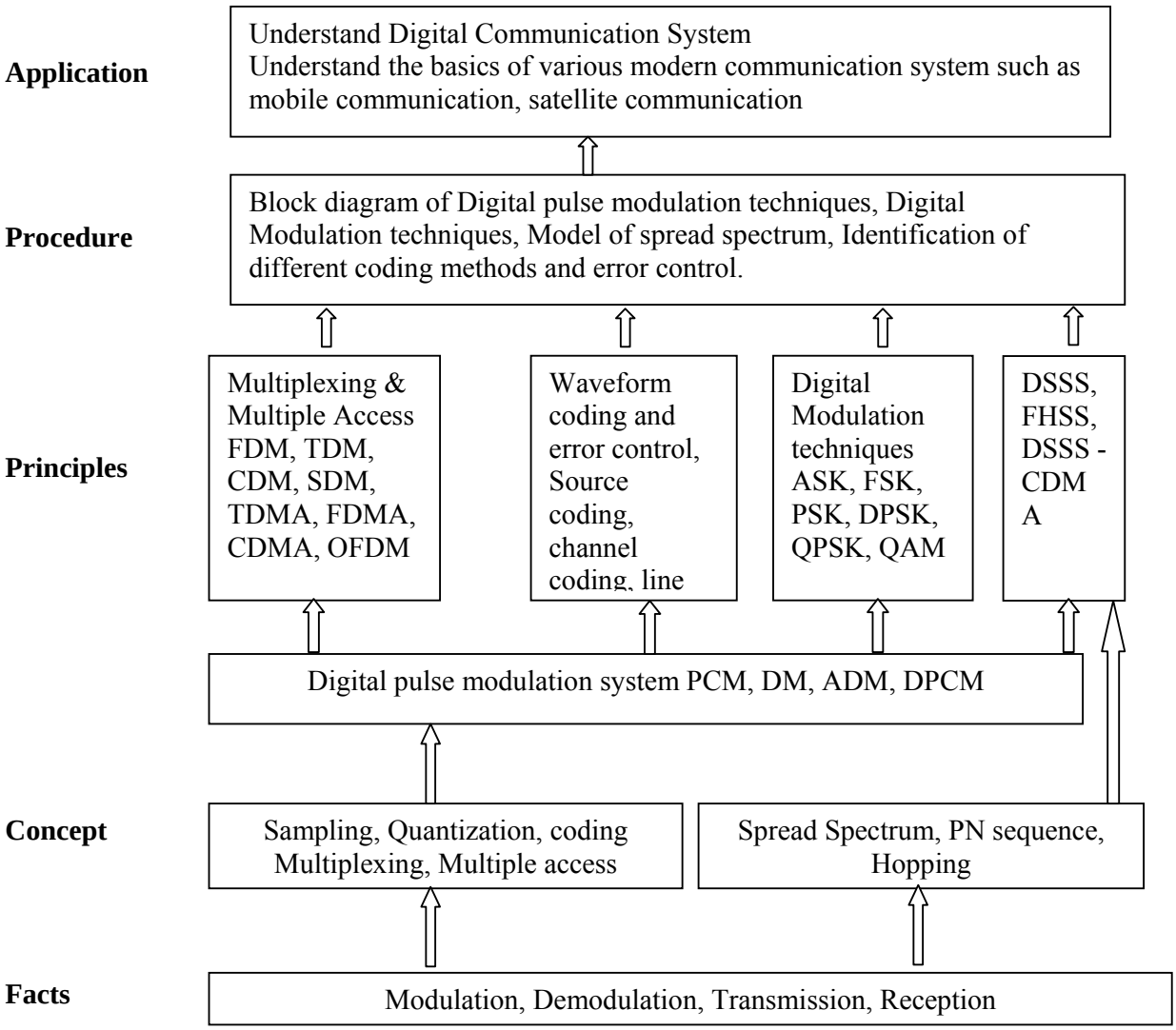
This subject familiarizes the student with digital information theory, information rate and channel capacity. This subject helps the students to understand the concept of principles of digital modulation technique, channel coding method and error control multiplexing, Multiple Access scheme and spread spectrum modulation.. The Knowledge acquired by student will help them to apply in various modern communication systems.

General Objectives:

Student will be able to

- Understand principles and Concept of various digital modulation techniques.
- Understand various coding, error detection and error correction methods.
- Understand various multiplexing technique and multiple Access Scheme.
- Understand spread spectrum modulation and their different methods.

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
Topic 1: Introduction of Digital Communication Specific Objectives: ➢ Define Digital Communication, communication channel ➢ Explain different element of Digital Communication. ➢ Compare analog. with digital communication Contents: • Historical perspective of Digital Communication • Elements of Digital Communication system with its block diagram. • Communication channel types and their Characteristics (bit rate, bandwidth, repeater distance) applications, and Channel modeling, channel noise. • Comparison of Analog and digital communication system.	02	06
Topic 2: Digital Pulse Modulation Techniques. Specific Objectives: ➢ Define and explain, generation and demodulation of various digital pulse modulation techniques. ➢ Define Sampling theorem ➢ Compare digital pulse modulation with analog modulation Contents: 2.1 [04 Marks] • Sampling process Nyquist sampling theorem. • Quantization process , Quantization error, Quantization noise, Uniform ,Non Uniform Quantization (companding) u law, A law (concept) 2.2 [16 Marks] • Pulse code modulation (PCM) Transmitter and Receiver block diagram and its working. Advantage and Disadvantages of PCM. • Differential pulse code modulation (DPCM). Transmitter and Receiver block diagram and its working, Advantage and disadvantage of DPCM • Delta Modulation (DM) Block diagram of Transmitter and Receiver, slope overload and Granular noise, Advantage and disadvantage of DM. • Adaptive Delta modulation (ADM) Transmitter and Receiver block diagram. Advantage and Disadvantages of ADM • Comparison of analog and Digital Pulse modulation, Comparison of various digital pulse Modulation	12	20
Topic 3: Coding Methods and Error Control. Specific Objectives: ➢ Define bit rate, baud rate ➢ State Hartleys law, Shannon Hartleys theorem and channel capacity. ➢ Define source coding ➢ Explain channel coding and their types and error correction codes. ➢ Define various types of line coding. Contents: 3.1 [06 Marks] • Bits, bit rate and baud rate, Hartleys law, Shannon Hartleys theorm, Channel capacity.	08	16

• Source coding, sources, Entropy, baudot code, Huffman coding. 3.2 [10 Marks] • Channel coding : error, causes of error and its effect ,error detection and correction using parity, error control codes, checksum, Two dimensional parity check Vertical redundancy Check (VRC) , Longitudinal Redundancy Check (LRC) , ,,,Cyclic Redundancy Check (CRC), Hamming codes. • Line coding: classification of line codes uni polar, Polar Non return to Zero (NRZ) and Return to zero (RZ), Bipolar (NRZ), Manchester (split phase), Differential Manchester Bipolar RZ, Pseudo ternary, alternate Mark Inversion (AMI) and their waveforms.		
Topic 4: Digital Modulation Technique. Specific Objectives: ➢ Define M- ary encoding ➢ Explain various transmitter & receiver for digital communication ➢ Compare various digital modulation techniques. ➢ Draw constellation and proper diagram. Contents: • M-ary encoding , Minimum bandwidth • Amplitude Shift Keying (ASK) Frequency shift keying (FSK), Phase shift keying (PSK), transmitter and receiver block diagram and their working with waveform. • Quadrature Phase shift keying (QPSK) , Quadrature amplitude modulation (QAM), Differential Phase shift keying (DPSK) transmitter and receiver block diagram and their working with waveform. • Constellation diagram and phasor diagram of each modulation techniques. • Comparison of Digital modulation technique along with bandwidth of each one.	12	24
Topic 5: Multiplexing & Multiple Access. Specific Objectives: ➢ Define FDM , TDM , CDM SDM ➢ Explain multiple acess system like FDMA , TDMA , CDMA , SDMA ➢ Compare OFDM , and CDMA Contents: 5.1 [10 Marks] • Need of Multiplexing Time Division Multiplexing (TDM), Frequency Division Multiplexing (FDM), Code Division multiplexing (CDM), Space Division Multiplexing (SDM) definition, block diagram and their comparison. • T carrier system, Digital multiplexing hierarchy, North American hierarchy, The CCITT digital multiplexing hierarchy • Introduction to Wavelength Division Multiplexing (WDM) 5.2 [10 Marks] • Access techniques Time Division Multiple Access (TDMA), Frequency Division multiple Access (FDMA), Code Division Multiple access (CDMA), Space Division Multiple Access (SDMA), comparison of different Access techniques.	08	20

• Wide band modulation Techniques: Orthogonal Frequency Division Multiplexing (OFDM) basic principle of orthogonality, single vs. multicarrier system OFDM block diagram and its explanation. Comparisons between CDMA and OFDM		
Topic 6: Spread Spectrum Modulation Specific Objectives: ➢ Define PN sequence ➢ Explain Spread Spectrum modulation s DSSS & FHSS ➢ Sate Applications of S.S modulation Contents: 6.1 [06 Marks] • Introduction to spread spectrum (SS) Modulation, advantages over fixed frequency, Types of SS Modulation Applications of SS modulation. • Pseudo Noise (PN) sequence: definition, generation and maximum length sequence • Model of Spread Spectrum modulation system 6.2 [08 Marks] • Direct sequence spread spectrum signal. • Frequency spread spectrum. Slow frequency hopping and fast frequency hopping. • Comparisons of Direct sequence spread spectrum (DSSS) and Frequency Hop spread spectrum (FHSS) • DSSS based CDMA system , CDMA with FHSS block diagram	06	14
Total	**48**	**100**

Practical:
Skills to be developed:

Intellectual Skills:
1. Interpret given circuit, type of modulation
2. Interpret the results
3. Interpret the various types of waveforms

Motor Skills:
1. Draw circuit diagram
2. Setting up of equipment
3. Accurate observation and draw the waveforms

List of Practicals:
1. Verification of sampling theorem. Observe and plot waveforms of Pulse Code Modulation & Demodulation, observe PCM output with A-law and u-Law.
2. Observe and plot waveforms of Differential Pulse Code Modulation & Demodulation
3. Observe and plot waveforms of Delta & Adaptive Delta Modulation & Demodulation
4. To generate following different line codes UPNRZ, PRZ, BPRZ,PNRZNRZ (Unipolar) and observe waveforms of Line codes on CRO. To generate Manchester &Differential Manchester codes and decode them.
5. Observe and plot waveforms of ASK,FSK,PSK Modulation & Demodulation
6. Observe and plot waveforms of QPSK Modulation & Demodulation

7. Observe and plot waveforms of QAM Modulation & Demodulation
8. Observe and plot waveforms of DPSK Modulation & Demodulation
9. FDM & TDM multiplexing / demultiplexing system
10. To generate variable length PN sequence. To generate CDMA-DSSS signal and demodulate it. To study spreading and dispersing
11. To generate FHSS modulated signal and demodulate it. To study spreading and dispersing

Learning Resources:

1. Books:

Sr. No.	Author	Title	Publisher
1.	P. Ramakrishna Rao	Digital Communication	Tata Mcgraw Hill
2.	Amitabha Bhattacharya	Digital Communication	Tata Mcgraw Hill
3.	Wayne Tomasi	Electronics Communication System	Pearson Education
4.	Upen Dalal	Wireless Communication	Oxford

2. Websites:

1. http://academicearth.org/courses/principles-of-digital-communication lecture 1 & lecture 6
2. http://nptel.iitm.ac.in/video.php?subjectId=117101051digital communication lecture series
3. http://educypedia.karadimov.info/electronics/javamodulationdig.htm FDMA, TDMA, CDMA, FSK, PAM etc Animations
4. http://educypedia.karadimov.info/electronics/rfdigmod.htm various topics on digital modulation

Course Name : Electronics Engineering Group

Course Code : ET/EN/EX/EJ/DE/ED/EI

Semester : Fifth

Subject Title : Control System & PLC

Subject Code : 17536

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50#	--	25@	175

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

Control is the process of causing a system variable to take some desired value, known as reference value. A control system consists of several elements or components connected and operated in such a way as to achieve a desired control in a specific domain of operation of the system. This can be as simple as making the temperature in a room stay at 21°C or as complex as manufacturing an integrated circuit or guiding a spacecraft to Jupiter. In general, all the elements necessary to accomplish the control objective are described by the term control system.

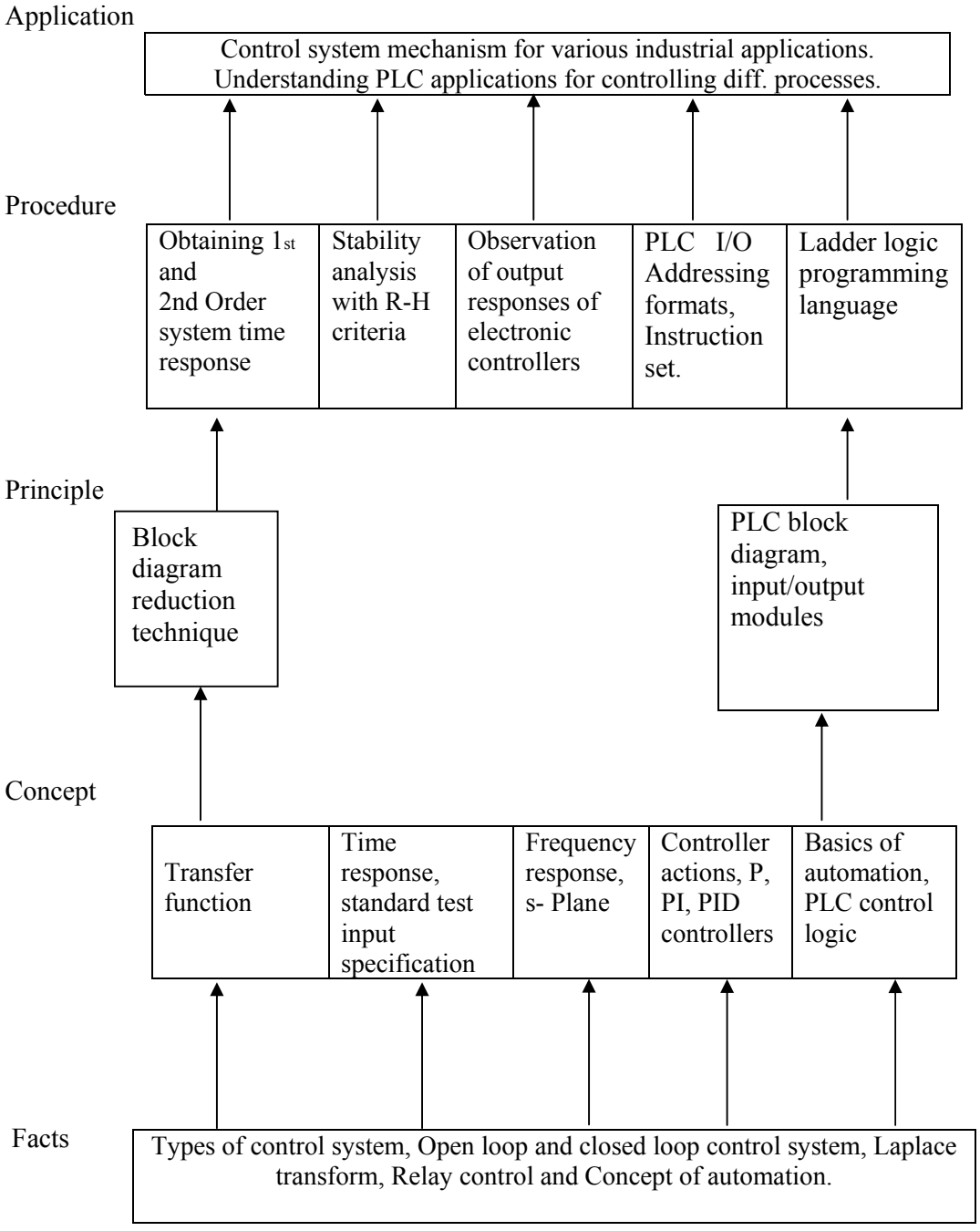
The subject intends to teach the student different control systems used in various field like automobile industry in application such as pick and place, welding, spray painting etc. The subject introduces the common industrial control system elements such as Programmable logic controller.

General Objectives:

The student will be able to:

1. Understand classifications of control system.
2. Understand Steady state, time response, and frequency response analysis.
3. Analyze the Stability of control system using RH criteria.
4. Understand the fundamentals and diff. Hardware parts of PLC.
5. Draw ladder diagrams to program PLC

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
Topic 1: Introduction to the Control System Specific Objectives: ➢ Explain different types of control system ➢ Develop transfer functions ➢ Differentiate between 1st& 2nd order of system ➢ Develop and solve block diagram of control system Contents: 1.1 [4 Marks] • **Control System:** Definition and practical examples. • **Classification of control system:** Open loop & closed loop systems - definition, block**,** diagram, practical example, and Comparison**,** Linear and non linear system**,** Time varying and time in varying systems • **Servo system:** Definition, Block diagram, classifications (AC & DC)**,** Block Diagram of DC servo system. 1.2 [4 Marks] • **Laplace transform:** Significance in control system. • **Transfer function:** Definition, Derivation of transfer functions for close loop& open loop control system, Differential equations & Transfer functions of RC and RLC electrical circuits. 1.3 [8 Marks] • **Order of a system**: Definition, 0, 1, 2 order system standard equation, practical examples. • **Block diagram reduction technique:** Need, reduction rules, problems.	08	16
Topic 2: Time Response Analysis Specific Objectives: ➢ Appreciate the importance of standard inputs and apply them in analysis of control system ➢ Differentiate between poles and zeros ➢ Analyze 1st& 2nd order control system for step input ➢ Calculate time response specifications for different systems Contents: 2.1 [4 Marks] • **Time domain analysis:** Transient and steady state response • **Standard test inputs:** Step, ramp, parabolic & impulse, Need, significance, and corresponding Laplace representation. • **Poles& zeros:** Definition, S-plane representation 2.2 [8 Marks] • **First order control system:** Analysis for unit step input, Concept of time constant • **Second order control system:** Analysis for unit step input, Concept, definition & effect of damping 2.3 [8 Marks] • **Time response specifications** (no derivations)	12	20

Tp,Ts,Tr,Td,Mp,ess. Problems on time response specifications • **Steady state analysis**: Type 0,1,2 systems, Steady state error & error constants, numerical Problems		
Topic 3: **Stability** Specific Objectives: ➢ Appreciate the importance of stability ➢ Analyze different types of stability ➢ Apply Routh's stability criterion for stability analysis and solve the numerical. Contents: 3.1 [4 Marks] • **Stability:** Definition of stability, Analysis of Stable, unstable, critically stable & conditionally stable system, Relative stability, Root locations in S-plane for stable and unstable systems. 3.2 [8 Marks] • **Routh's Stability Criterion:** Different cases & conditions (statement method),Numerical Problems	06	12
Topic 4: Control Actions Specific Objectives: ➢ Explain the need of Control actions ➢ Differentiate between different types of Control actions Such as P, I & D ➢ Explain composite controllers; PI, PD, PID controllers Contents: 4.1. [4 Marks] • **Process control system**: Block diagram & explanation of each block. 4.2. **Control actions** [8 Marks] • **Discontinuous modes:** ON OFF controllers: equation, neutral zone • **Continuous modes:** PROPORTIONAL controllers (offset, proportional band), INTEGRAL & DERIVATIVE controllers; o/p equations, corresponding Laplace Transforms, Response of P,I & D controllers • **Composite controllers**: PI, PD, PID controllers- O/P Equations, Response, Comparison	04	12
Topic 5: PLC Fundamentals Specific Objectives: ➢ Explain the basics of PLC. ➢ Draw functional block diagram of PLC. Contents: **5.1** [4 Marks] • Evolution of PLC in automation, need and benefits of PLC in Automation. **5.2** [12 Marks] • **Block diagram & description of different parts of PLC** : CPU – function, scanning cycle, speed of execution, Power supply-	06	16

function, Block diagram, Memory – function & organization of ROM & RAM, Input modules- function, diff. input devices used with PLC(only name & their uses) Output modules- function, diff. output devices used with PLC(only name & their uses) ,Fixed and Modular PLCs.		
Topics 6: PLC Hardware &Programming Specific Objectives: ➢ Explain the details of diff. I/O modules of PLC. ➢ Get familiar with the instruction set of PLC system. ➢ Develop PLC programming skills**.** Contents: 6.1. [8 Marks] • **Discrete input modules:** Block diagram, typical wiring details and specifications of AC input modules & DC input module. Sinking and sourcing concept in DC input modules. • **Discrete output modules:** Block diagram description, typical wiring details and specifications of AC output module & DC output modules. • **Analog input and output modules:** Block diagram, typical wiring details and specifications. 6.2. [16 Marks] • **I/O addressing of PLC** • **PLC Instruction set**: relay instructions, timer instructions, counter instructions, data handling instructions, logical and comparison Instructions. • PLC programming examples based on above instruction using Ladder programming language.	12	24
Total	**48**	**100**

Practical:
Skills to be developed:

Intellectual Skills:

- Reading and interpretation of the graph.
- Interpretation of the results from observations and calculations.
- Software development
- Programming using ladder language

Motor Skills:

- Proper handling of instruments.
- Measuring physical quantities accurately.
- Observational Skills

List of Practical:

1. Measurement and control of error of angular position of DC Servo system.
2. Step response of first order R-C circuit.
3. Measurement & control of temperature with on-off controller
4. Measurement & control of temperature with PID controller.
5. Measurement & control of temperature with Proportional controller.

6. Verify functions of logic gates by using PLC.
7. Write and verify ladder program for ON-Off control of Lamp.
8. Write and verify ladder program for stepper motors.
9. Verify the use of Timers and counters with suitable application.
10. Design of temperature control system using PLC.

List of Laboratory equipment:

1. DC Position trainer kit
2. PID controller trainer kit
3. PLC Trainer kit(with minimum 20 digital I/O points and 2 Analog I/O channels)

List of Assignments:

Numerical problems from Chapter 1, 2 & 3.

Learning Resources:

1. Books:

Sr. No.	Author	Title	Publisher
1	J. J. Nagrath & M. Gopal	Control System Engg.	McGraw-Hill
2	K. Ogata	Modern control Engg.	PHI
3	C. D. Johnson	Process control instrumentation Technology	Prentice Hall
4	Gary Dunning	Intro. To Programmable logic control	Cenage Learning
5	F. D. Petruzella	Programmable logic controllers (Third edition)	Tata McGraw-Hill
6	Jhon Hackworth and Federic Hackworth	Programmable logic controllers	Pearson education

2. Websites:

www.learningpit.com - for PLC simulation software downloading.
www.plctutor.com - for PLC tutorials
en.wikipedia.org/wiki/PID_controller

Course Name : Electronics Engineering Group

Course Code : EJ/EX/ET/EN/DE

Semester : Fifth

Subject Title : Audio Video Engineering

Subject Code : 17537

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

The field of television engineering and video system has witnessed rapid growth especially in digital TV broadcast and recording system. Thus with widespread use of advanced audio and video equipments, the subject audio and video engineering is introduced in electronic engineering group of diploma courses .This subject is also useful for enhancing the knowledge of analog system applications.

The topic on Audio engineering contains Hi-Fi amplifiers with mono and stereo amplifiers, public address system, and Dolby-NR recording system similarly CD player and disc recording of audio and video signals and their playback.

The topic on Video Engineering contains TV fundamentals with basic parameters of TV, tri-colour theory, composite-video signal, CCIR-B standards. The contents of colour TV includes audio video-signal transmission and reception, positive and negative modulation, camera tubes, picture tube, colour TV decoder and latest TV technology such as HDTV, LCD TV, LED TV.

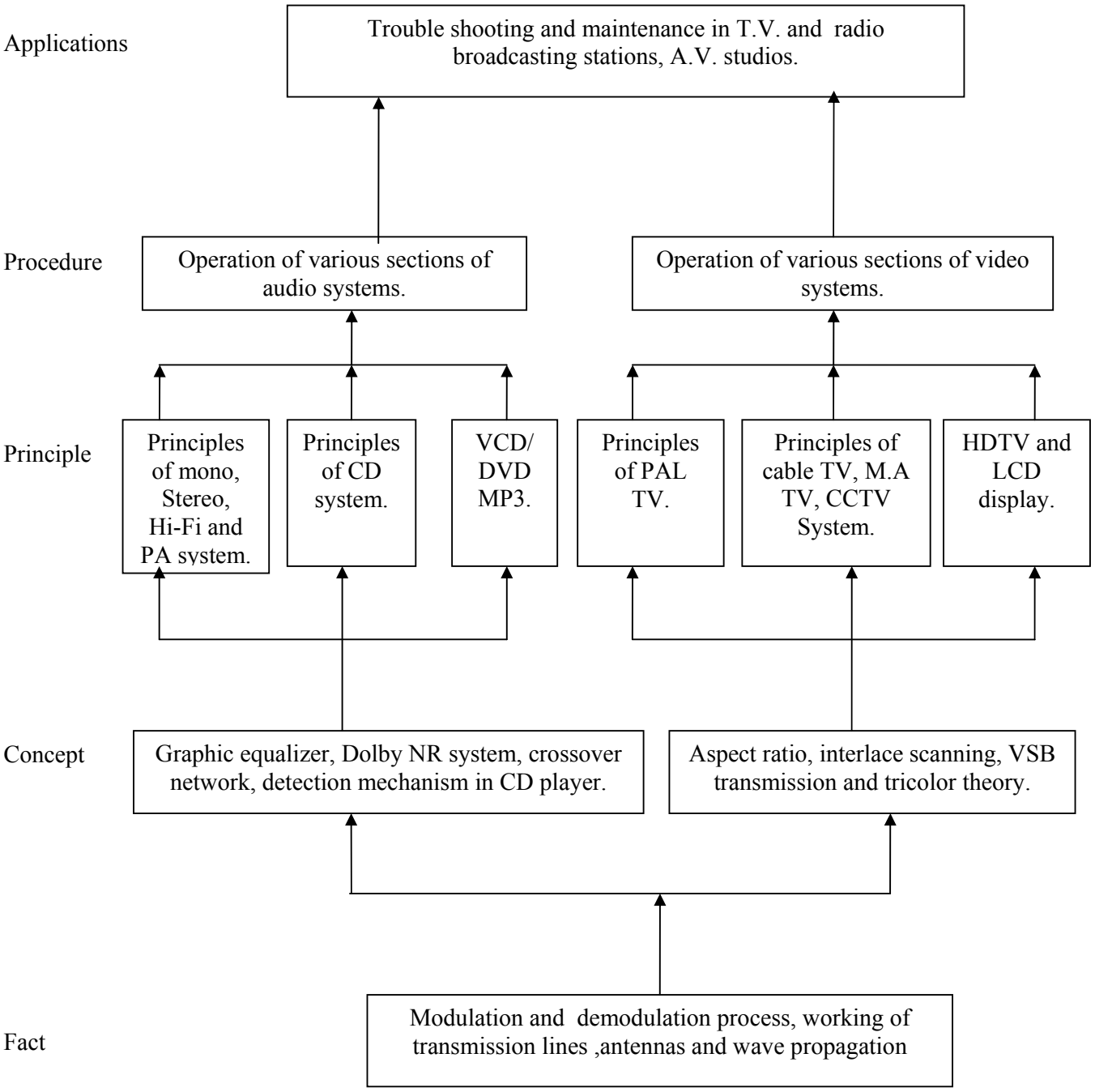
The topic on cable TV explains how the TV signals are collected from different sources, mainly satellite and on due processing distributed from cable station to subscribers over the cable network.

General Objectives:

Students will able to

1) Understand operation of audio amplifiers.
2) Analyze quality of reception of various sound systems and graphic equalizer
3) Understand CD player mechanism.
4) Understand the principle of operation of various advanced TV systems.

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
Topic 1] Hi Fi Audio Amplifier **Specific Objectives:** **Students will be able to** ➢ Distinguish between different types of Audio amplifiers ➢ Explain the principle and operation of Graphic equalizer ➢ Draw labeled sketch of Hi-Fi amplifier ➢ Define pre-emphasis and de-emphasis **Contents:** • Introduction to Amplifiers: Mono, Stereo, Public Address. Difference between stereo amplifier and Mono amplifier. • Block diagram of Hi Fi amplifier and its working. Controls available on it and their function, Graphic equalizer concept- circuit diagram and operation. (5-Point Circuit diagram) • Dolby NR recording system • Types of speaker –woofer, Mid-range, Tweeter • Cross over network circuit and its function	07	12
Topic 2] CD player **Specific Objectives:** ➢ Describe the principle of detection mechanism of CD player ➢ List the components used in CD mechanism **Contents:** • CD – Material used, Size and Capacity. • Block diagram and operation of CD player. • Component used for CD mechanism: CD pick-up assembly, gear system, drive motors, CD lens. Function of front panel controls. • Function of remote control transmitter and receiver unit used in CD player. • Advantageous of Vacuum florescent.	05	12
Topic 3] TV Fundamentals **Specific Objectives:** ➢ Define various terms used in TV system ➢ Draw and label composite video signal wave-forms ➢ State CCIR-B standards for TV system **3.1 [08 Marks]** • Concept: Aspect ratio, image continuity, interlace scanning, scanning periods – horizontal and vertical, vertical resolution, horizontal resolution. • Vestigial sideband transmission, bandwidth for Colour signal, brightness, contrast, viewing distance, luminance, Hue, saturation, compatibility. **3.2 [08 Marks]** • Colour theory, primary colours and secondary colours Grassman's law, additive Colour mixing subtractive Colour mixing. **3.3 [08 Marks]** • Composite Video Signal - Pedestal height, Blanking pulse, Colour burst, Horizontal sync pulse details, Vertical sync pulse details, Equalizing pulses, CCIR B standards for Colour signal transmission & reception. • TV channel allocation for band I & band III.	09	20

TOPIC 4] TV Transmitter and Receiver **Specific Objectives:** ➢ Identify modulation technique used for audio and video signal transmission ➢ Distinguish between positive and negative modulation ➢ Describe TV camera tube and colour picture tube ➢ Explain the function of Color TV transmitter and receiver. **Contents:** **4.1 [04 Marks]** • Audio and Video signal transmission using AM and FM modulation. • Positive and Negative modulation, Merits and Demerits of Negative modulation. **4.2 [08 Marks]** • Introduction to TV camera tube, principle and working of Vidicon Plumbicon Solid State camera based on CCD. • Color Picture tube, principle and working of PIL Delta gun picture tube. Trinitron **4.3 [08 Marks]** • Block diagram of Colour TV transmitter. • Block Diagram and operation of color TV receiver (PAL D type)	09	20
Topic 5] Colour TV **Specific Objectives:** ➢ Draw and explain PAL D Decoder ➢ Explain the operation of different sections of TV receiver ➢ Differentiate between NTSC,PAL and SECAM system ➢ Explain HDTV, LCDTV and LEDTV Contents: **5.1 [12 Marks]** • Block diagram and operation of of PAL-D decoder. Construction, operation and applications of Yagi Uda Antenna. • Circuit diagram of chroma signal amplifier, Burst pulse blanking, Colour killer control, Basic Circuit for Separation of U and V signals. ACC Amplifier. Colour signal matrixing, RGB drive amplifier. EHT generation: circuit explanation for line output stage using transistor or IC in Colour TV. **5.2 [04 Marks]** • HDTV: Development of HDTV, NHK MUSE System and NHK Broadcast. **5.3 [04 Marks]** • LCD/LED Technology: Principle and working of LCD and LED TV systems.	12	20

Topic 6] Cable Television **Specific Objectives:** ➢ List specifications of various components used in cable TV ➢ Interpret the architecture of cable TV ➢ Differentiate between MATV,CATV and CCTV ➢ Describe working of dB meter and DTH system **6.1 [06 Marks]** • Constructional details, working and radiation pattern of Dish antenna • Working principle of following components LNBC, Multiplexer, Attenuators Connectors (two ways and three ways), Amplifier and cable. **6.2 [08 Marks]** • MATV, CATV and CCTV**.** • Interpret the architecture of cable TV network. • Block diagram of dB meter with working principle. • Direct to Home System (DTH) Introduction and Block Diagram	06	16
Total	**48**	**100**

Practicals:

To develop following skills:

Intellectual Skills:

- Analyze the parameters and identify faults in audio amplifier and colour TV receiver.
- Trouble shooting of faults in audio amplifier and colour TV receiver.
- Discriminate different sections of TV system.
- Estimate cost of various TV system.

Motor Skills:

- Draw and illustrate different sections of audio and video systems.
- Test different sections of audio and video systems.
- Measure various parameters of audio and video systems.
- Install DTH system.

List of Practicals:

1. Trace and analyze voltage of Hi –Fi amplifier system.
   a) Trace the output stage of given Hi Fi amplifier system.
   b) Voltage analysis of a given Hi Fi amplifier.
2. Fault Finding (three different faults) in a Hi Fi Audio amplifier:
   a) By Signal injection method. b) Confirmation of faulty stage by voltage analysis method.
3. Plot frequency response of
   a) Graphic equalizer and
   b) Filters used in graphic equalizer.
4. Draw and observe drive mechanism layout of CD player.
5. Trace: a) Chroma Section, b) Picture Tube, c) Video Amplifier,
6. Trace: a) Horizontal section b) Vertical section c) Power supply section of TV receiver
7. Voltage analysis of:
   a) Chroma section, b) Picture Tube c) Video Amplifier,

8. Voltage analysis of:
   a) Vertical Section b) horizontal section c) Power supply of TV receiver.
9. Fault finding in given Colour TV:
   a) No color b) Red Colour only c) Blue color only d) Green color only.
   e) Magenta color only f) Cyan only g) Yellow only h) No raster. No Sound.
10. Fault finding in given Colour TV:
    a) Fault in HSYNC section. b) Fault in VSYNC section. c) Fault in SYNC separator. d) Fault in video amplifier.
11. Trace the circuit layout of LED television receiver.
12. Trace the circuit layout of LCD television receiver.

Assignments:

1. To collect information about Set Top box used for Cable TV at home and Installation of DTH System.
2. To estimate the cost and layout of Cable TV.
3. To collect information about LED and LCD display used in TV.
4. Visit to TV transmitter station and write report.

Learning Resources:

1) Books:

Sr. No.	Title	Author	Publisher
01	Television & Radio Engineering	A.M Dhake	Tata McGraw-Hill
02	Modern TV Pratice (4^{th} edition)	R.R Gulati	New age International
03	Television Engineering and Video System	R.G Gupta	Tata McGraw-Hill
04	Audio Video Systems	R.G Gupta	Tata McGraw-Hill
05	Basic Television and Video System	Bernard Grob	Tata McGraw-Hill
06	Modern CD Player Servicing Manual	Manohar Lotia	BPB Publication

2) Websites:

- http://en.wikipedia.org/wiki/Compact_Disc_player.
- http://en.wikipedia.org/wiki/High-definition_television.
- http://www.howstuffworks.com.
- http://en.wikipedia.org/wiki/Backlight.

Course Name : All Branches of Diploma in Engineering & Technology

Course Code : EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS/CR/ CO/CM/IF/ EE/EP/CH/PS/CD/ED/EI/CV/FE/FG/IU/MH/MI/TX/TC/DC/AU

Semester : Fifth for EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ME/PG/PT/AE/CE/CS/CR/ CO/CM/IF/EE/EP/CH/PS/AU and Sixth for CD/MH/IU/CV/FE/FG/MI/ ED/EI/DC/TC/TX

Subject Title : Behavioural Science

Subject Code : 17075

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	02	--	--	--	25 #	25 @	50

Rationale:

With increased globalization and rapid changing business expectations, employers are looking for wide cluster of skills to cater to the changing demand. Personality traits and soft skills are playing a key role in a student's career in this changing scenario. Corporate houses look for soft skills that supplement hard skills.

Addition of behavioural science in curriculum is intended to enhance the efficiency of a person so that he can contribute to overall growth of organisation. It aims at developing insight into leadership, team building, motivation, interpersonal relationship, problem solving, decision making and aspects of personality in a technician's profile. Addition of the topic of organizational culture will further mould him/ her in the organisational role.

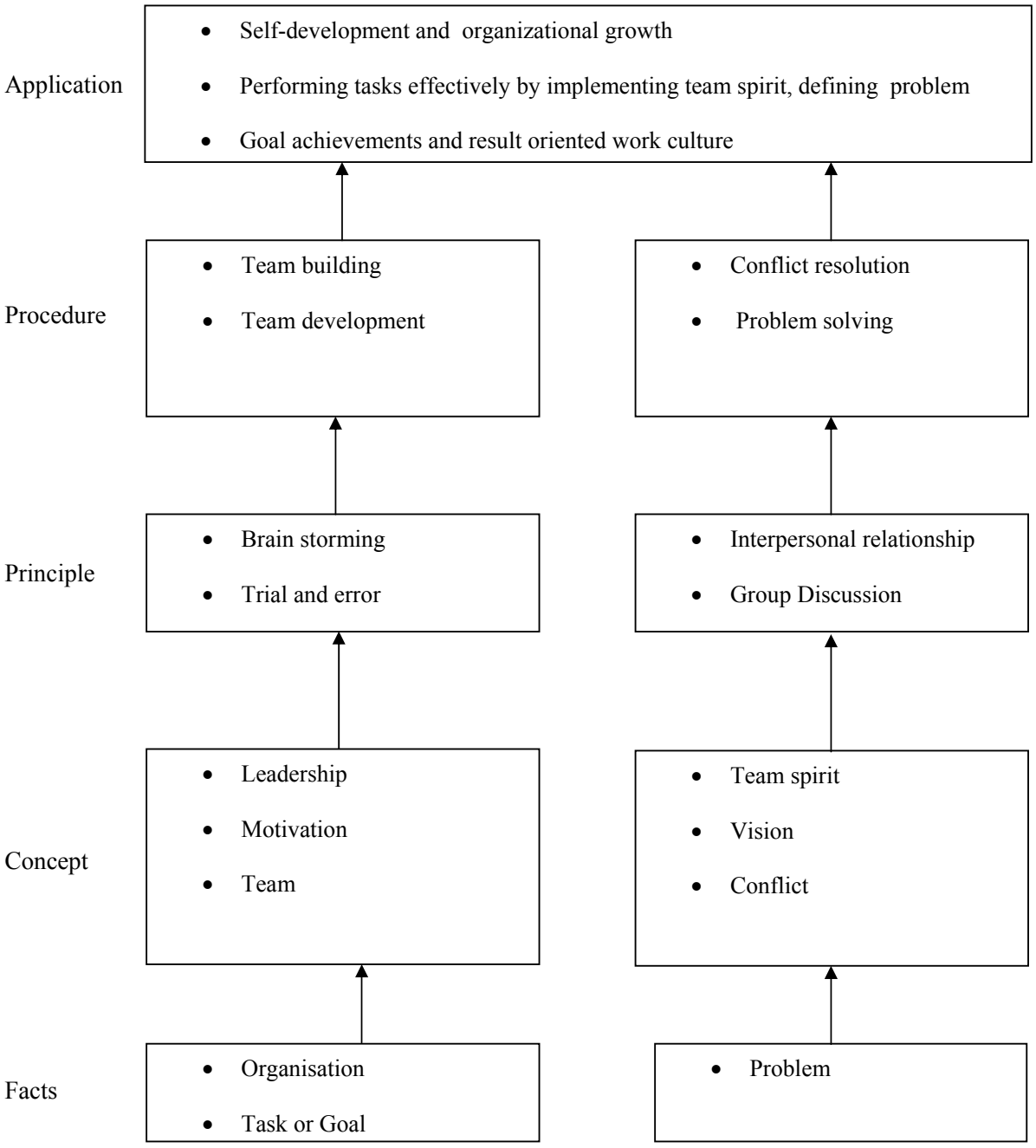
This subject of 'Behavioural Science' provides a broad base in which a technician can develop a successful career in the world of work.

General Objectives:

After studying this subject, the students will be able to:

1. Develop him/her as Team leader.
2. Use self-motivation and motivate others.
3. Build a team and develop team spirit among the team members.
4. Improve the interpersonal relationship skills.
5. Learn Problem solving and decision making skills.
6. Discuss a particular topic in a group and face the interview.

Learning Structure:



Theory:

Topic and Contents	Hours
TOPIC 1: LEADERSHIP Contents: 1.1 Introduction – Importance, examples of different types of leaders. 1.2 Meaning and Definition of Leadership. 1.3 Leadership qualities – Confidence, Vision, Communication Skills, influencing people etc. 1.4 Types of Leadership styles, their advantages and disadvantages – Autocratic, Democratic, Delegative, Bureaucratic and Laizze Fairie.	02
TOPIC 2: MOTIVATION Contents: 2.1 Meaning and Definition of motivation. 2.2 Types of motivation. 2.3 Maslow's Motivation theory. 2.4 Job characteristic model to enhance motivation.	03
TOPIC 3: TEAM BUILDING Contents: 3.1 Definition of Team. 3.2 Difference between Group and Team. 3.3 Need for formation of good team (vision, trust, cooperation, initiative, etc.) 3.4 Approach to Team building (Personality based, activity based, skill based, problem solving based, etc.)	02
TOPIC 4: CONFLICT RESOLUTION Contents: 4.1 Definition of Conflict. 4.2 Types of Conflict – Functional and Dysfunctional 4.3 Sources of Conflict – Ego, Authority, Frustration etc. 4.4 Positive and Negative effects of conflicts. 4.5 Methods of Conflict resolution – Compromising, withdrawal, forcing.	04
TOPIC 5: PROBLEM SOLVING AND DECISION MAKING Contents: 5.1 Steps in Problem Solving. 5.2 Methods used for solving problems – trial and error method, brain storming, lateral thinking method. 5.3 Techniques used for Decision making- Decision tree, Decision Matrix, Mind Mapping etc.	03
TOPIC 6: GROUP DISCUSSION AND INTERVIEW TECHNIQUES Contents: 6.1 GROUP DISCUSSION • Objectives of Group Discussion (ability to work in team, speaking and listening skills, leadership, creativity) • Does and Don'ts of Group Discussion. • How to conclude Group Discussion.	02

6.2 INTERVIEW TECHNIQUES • Types of Interviews. (patterned, stress, behavioural) • Dress Code, Body Language and Communication Skill. • Probable questions for Interview. • Telephonic or Video Interview.	
Total	**16**

Practical:
Skills to be developed:

Intellectual Skills:

- Develop ability to find his strengths.
- Select proper source of information.
- Follow the technique of time and stress management.
- Set the goal.

Motor Skills:

- Follow the presentation of body language.
- Work on internet and search for information.
- Prepare slides / transparencies for presentation.

List of Practicals / activities:

1. Form a group of 4 or 5 students and discuss the topic 'Qualities of an effective leader'. Each group will prepare its list with justification to the entire class and write an assignment under the guidance of subject teacher.
2. Form a pair of student and each one from pair will ask each other questionnaire on motivation, self-motivation, experiences that motivated him or other which him for success in the past and write an assignment under the guidance of subject teacher based on discussion.
3. Form a group of 4 or 5 students and assign them a group activity such as 'making a shape from match stick (50 to 100 match sticks) without guidance and without group discussion.
4. The group as in activity 3 will now perform the same activity. After group discussion and under guidance of subject teacher, each student from a group will write an assignment for both the activities and write their inferences with reference to group discussion, team development, team building, etc.
5. Form a group of 8 to 10 student and arrange a group activity such as;
    - Industrial visit.
    - Visit to any historical place/fort/museum, etc
    - Housekeeping and cleaning of any laboratory/seminar hall for any function.

    After the execution of activity student will write an assignment under guidance of teacher keeping in mind individual role, purpose of activity, inter dependency of work or task, coordination of person and task involved and final performance.
6. Write an assignment on interpersonal relationship and conflict management with student's personal experience of solving conflicts.
7. Form a group of 20 students and ask them to prepare a list of 8 to 10 problems affecting the institute. Subject teacher should analyze one such problem on black board using 'Fish bone technique' with the participation of students. Students will write an assignment consisting;
    - Apparent problem statement.
    - Analysis of the causes.

- Definition of real problem.

8. The subject teacher starts the session with 'Statement of the problem' written on the black board. After ensuring that all the participants are at the same level of understanding the statement of problem, he initiates NGT (Normal Group Technique) to arrive at maximum possible number of creative solutions.
   Based on ranking matrix the group will arrive at feasible solutions and students will write an assignment consisting of;
   - Problem Statement.
   - Model of problem solving.
   - List of creative solution suggested by participants.
   - Write the most feasible solution based on given criteria.

9. Form a group of 4 to 5 students and give them a topic for GD for 10 to 15 minutes. Teacher should analyse GD on certain parameters and students will write an assignment on aspects of GD and prepare a format (suggested or designed by teacher) which gives details of GD carried out.
10. Arrange a guest lecture of H.R. Person from industry/expert in interview technique and conduct mock interview of each student. Student should write a report on this activity.
11. Arrange a visit to industry and gather information about organisation, product, turnover, work culture, vision/mission statement, quality policy, Corporate social responsibility etc and write a report on it.

Note - Subject teacher shall guide the students in completing the assignments based on above practicals.

Learning Resources:
Books:

Sr. No.	Author	Name of Book	Publication
1	Subject Experts-MSBTE	Handbook and assignment book on Development of Life Skills-II	MSBTE
2	Dr. Kumkum Mukherjee	Principles of management and organizational behaviour	Tata McGraw Hill Education Pvt Ltd.
3	Dr.T.Kalyana Chakravarti Dr.T.Latha Chakravarti	Soft Skills for Managers	Biztantra
4	Barun K Mitra	Personality Development and soft skills	Oxford University Press
5	Priyadarshini Patnaik	Group discussion and interview skills	Foundation Books

Course Name : Electronics Engineering Group

Course Code : ET/EN/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI

Semester : Fifth for ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU and Sixth for IU/ED/EI

Subject Title : Entrepreneurship Development and Project

Subject Code : 17066

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	02	--	--	--	--	25@	25

NOTE:

- Two practical hours are for project
- One theory and one tutorial hours are for Entrepreneurship Development (EDP). Twenty five marks are for term work report prepared under EDP.

Rationale:

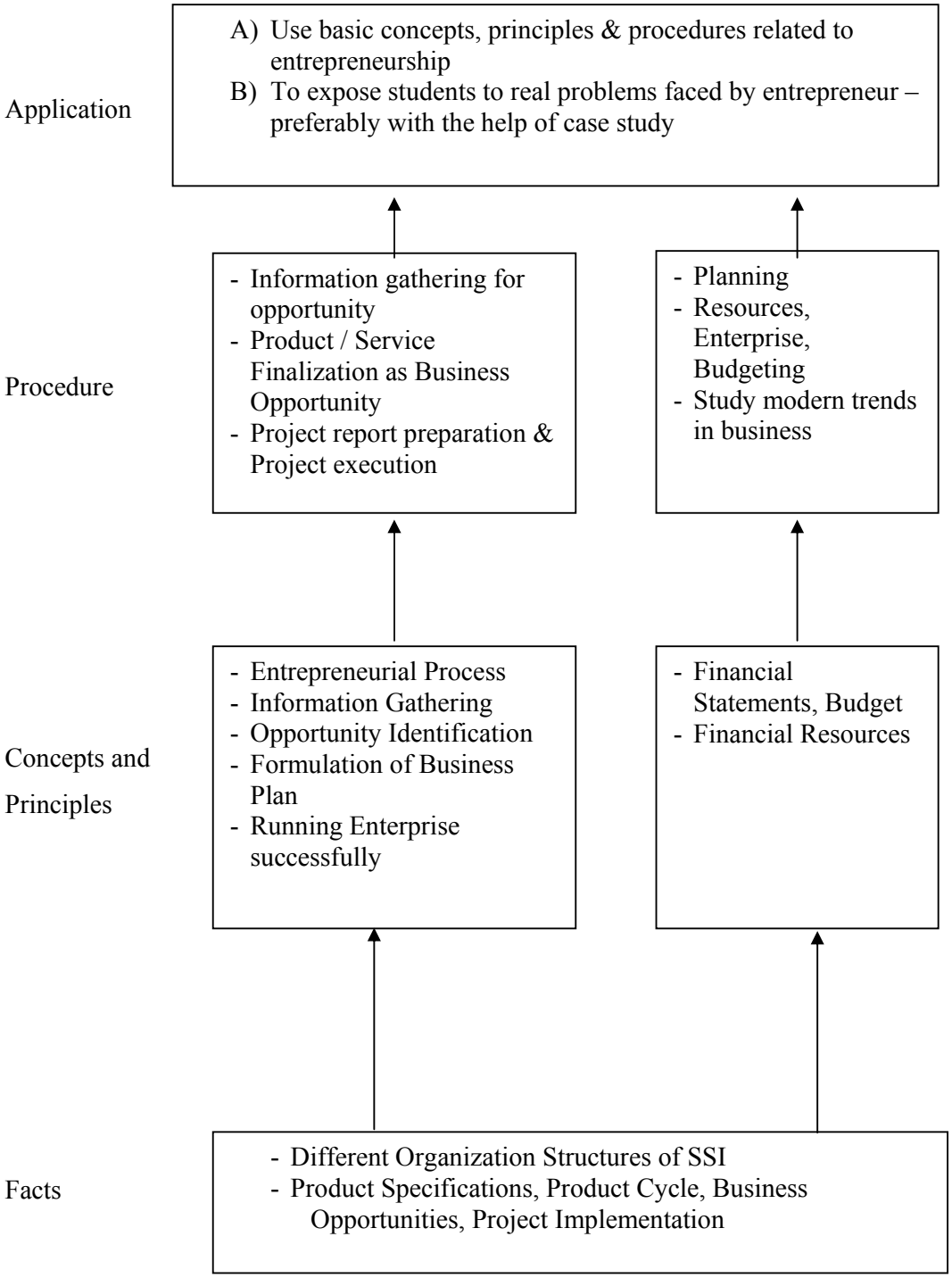
Globalization, liberalization & privatization along with revolution in Information Technology, have thrown up new opportunities that are transforming lives of the masses. Talented and enterprising personalities are exploring such opportunities & translating opportunities into business ventures such as- BPO, Contract Manufacturing, Trading, Service sectors etc. The student community also needs to explore the emerging opportunities. It is therefore necessary to inculcate the entrepreneurial values during their educational tenure. This will help the younger generation in changing their attitude and take the challenging growth oriented tasks instead of waiting for white-collar jobs. The educational institutions should also demonstrate their uniqueness in the creation of enterprising personalities in their colleges. This subject will help in developing the awareness and interest in entrepreneurship and create employment for others.

General Objectives:

The students will be able to

1) Appreciate the concept of Entrepreneurship
2) Identify entrepreneurship opportunity.
3) Develop entrepreneurial values and attitude.
4) Collect and use the information to prepare project report for business venture.
5) Develop awareness about enterprise management.

Learning Structure:



Content:

Part A) Industrial Project

Following activities related to project are required to be dealt with, during this semester.

1. Form project batches & allot project guide to each batch. (Max. 4 students per batch)
2. Each project batch should select topic / problem / work by consulting the guide & / or industry. Topic / Problem / work should be approved by Head of department.
3. Each project batch should prepare action plan of project activities & submit the same to respective Guide
4. At the end of semester, each project batch should submit the action plan and abstract of the project along with list of materials required if project involves fabrication or other facilities required in other kinds of project.
5. Action Plan should be part of the project report.

Part B) Entrepreneurship Development

Theory:

Topic and Contents	Hours
Topic 1: Entrepreneurship, Creativity & Opportunities Contents: 1.1 Concept, Classification & Characteristics of Entrepreneur 1.2 Creativity and Risk taking. 1.3 Business types and Reforms 1.4 SWOT Analysis	**03**
Topics 2: Information and Support Systems for Development of Entrepreneurship: Contents: 2.1 **Information Sources:** Information related to project, procedures and formalities **2.2) Support Systems** 1) Business Planning & Requirements for setting up an SSI 2) Govt. & Institutional Agencies (Like MSFC, DIC, MSME, MCED, MSSIDC, MIDC LEAD BANKS) Statutory Requirements and Agencies.	03
Topics 3: Market Assessment and Product feasibility Contents: 3.1) Marketing -Concept and Importance Market Identification, 3.2) Customer need assessment, Market Survey Product feasibility analysis	02
Topics 4: Business Finance & Accounts 4.1) **Business Finance:** Costing basics, Sources of Finance, Break Even Analysis, 4.2) **Business Accounts:** Book Keeping**,** Financial Statements, Financial Ratios and its importance, Concept of Audit,	03
Topics 5: Project Report Preparation 5.1) Business plan: Steps involved from concept to commissioning 5.2) **Project Report** 1) Meaning and Importance 2) Components of project report/profile 5.3) **Project Feasibility Study:** 1) Meaning and definition 2) Technical, Market, Financial feasibility	03
Topics 6: Enterprise Management And Modern Trends 6.1) **Enterprise Management**: - 1) Essential roles of Entrepreneur in managing enterprise	02

2) Probable Causes Of Sickness 6.2) E-Commerce: Concept and process 6.3) Global Entrepreneur	
Total	**16**

Tutorial:

Sr. No	Assignments
1	Assess yourself-are you an entrepreneur?
2	An Interview with an Entrepreneur.
3	Feasibility study of a product.
4	Prepare a Project Report for starting a small scale business.

FONT SIZE OF PROJECT REPORT CONTENTS BE AS FOLLOWS:

1. MAIN TITLE: 16 BOLD TIMES NEW ROMAN/ ARIAL
2. SUB TITLES: 14 BOLD TIMES NEW ROMAN/ ARIAL
3. RUNNING MATTER: 12 TIMES NEW ROMAN / ARIAL

Format of the Project report should be designed by the department.

Learning Resources:

1) Reference Books:

Sr. No.	Name of Book	Author	Publisher
1	Entrepreneurship	Trehan	Dream Tech Press
2	Entrepreneurship 2/e	Rajeev Roy	Oxford University Press
3	Entrepreneurship and Small Business	Schaper	Wiley India Publication
4	Entrepreneurship Development	Colombo plan staff college for Technical education.	Tata Mc Graw Hill Publishing co. ltd. New Delhi.
5	Poornima M. Charantimath	Entrepreneurship Development of Small Business Enterprises	Pearson Education
6	Entrepreneurship Development	E. Gorden K.Natrajan	Himalaya Publishing. Mumbai

2) VIDEO CASSETTES

No.	SUBJECT	SOURCE
1	Five success Stories of First Generation Entrepreneurs	EDI STUDY MATERIAL Ahmedabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : ediindia@sancharnet.in/olpe@ediindia.org Website : http://www.ediindia.org
2	Assessing Entrepreneurial Competencies	
3	Business Opportunity Selection and Guidance	
4	Planning for completion & Growth	
5	Problem solving-An Entrepreneur skill	

Course Name : Electronics Engineering Group

Course Code : ET/EJ/EN/EX/IE/DE/ED/EI

Semester : Fifth

Subject Title : Professional Practices-III

Subject Code : 17067

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
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Rationale:

Most of the diploma holders are employed in industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities, which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

To develop the following skills:

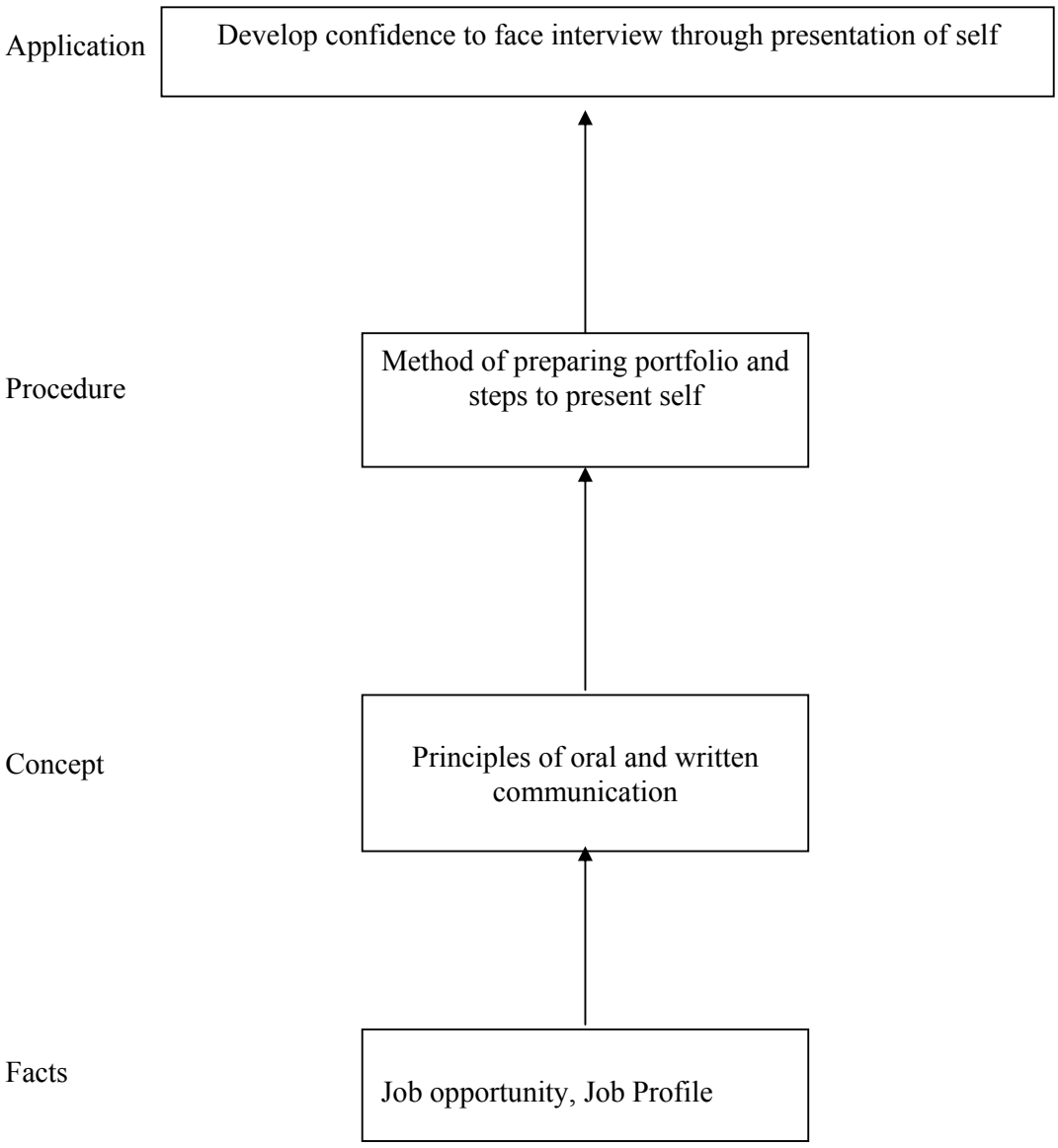
Intellectual Skills:

1. Analyze the information received from different sources.
2. Prepare report for given topic.

Motor Skills:

1. Present given topic in a seminar.
2. Interact with peers to share thoughts.
3. Prepare a report on industrial visit, expert lecture.

Learning Structure:



Activity	Name of the Activity	Hours
1	**Industrial Visits** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. The industrial visits may be arranged in the following areas / Industries. • Satellite earth station • Radar Establishment • Mobile Telephone Office • Any other relevant area	16
2	**Lectures by Professional / Industrial Expert to be organized from the following areas.** • Mobile Communication • Software Debugging • Fuzzy logic and Neural network • Recent trends in digital communication • Nanotechnology • Carrier guidance and interviewing techniques • Self- employment • Blue tooth technology. • Any topic related to social awareness	08
3	**Information Search:** Students should prepare report as a part of term work of searching and collecting the information regarding their final project/industrial project	06
4	**Seminar** Student will deliver a seminar on technical topic. The topic will be on his project or new trends in technology or the subject of the Sixth semester	10
5	**Group Discussion** The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. The Faculty may suggest the topic for group discussion	08
	Total	**48**

Industrial Training (Optional)

- Students who have completed industrial training in summer vacation after 4th Semester will be granted exemption for activities related to topic 1 to 4.

- These students shall submit report of Industrial training signed and certified by authorities from Industry. Student will give seminar on industry training attended by him.

- Evaluation will be done on seminar and report submitted by student.