

 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)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
								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	
<p>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.</p>																	

 MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES																	
COURSE NAME : DIPLOMA IN INDUSTRIAL ELECTRONICS																	
COURSE CODE : IE																	
DURATION OF COURSE : 6 SEMESTERS for IE and 8 SEMESTERS for IU										WITH EFFECT FROM 2012-13							
SEMESTER : FIFTH										DURATION : 16 WEEKS							
PATTERN : FULL TIME-SEMESTER										SCHEME : G							
SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (17500)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
								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	Control Systems	CSY	17538	03		02	03	100	40	50#	20	--	--	25@	10		
4	Industrial Electronics and Applications	IEA	17541	03	--	02	03	100	40	50#	20	--	--	25@	10		
5	Advanced Industrial Electronics	AIE	17542	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	17069	--	--	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 ET / EJ / EN / EX / IS / IC / DE / EV / IU / ED / EI / 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.

 MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES																	
COURSE NAME : ELECTRONICS AND VIDEO ENGINEERING																	
COURSE CODE : EV																	
DURATION OF COURSE : 6 SEMESTERS								WITH EFFECT FROM 2012-13									
SEMESTER : FIFTH								DURATION : 16 WEEKS									
PATTERN : FULL TIME - SEMESTER								SCHEME : G									
SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (17500)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
								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	TV Receiver	TRE	17547	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	17071	--	--	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 ET / EJ / EN / EX / IE / IS / IC / DE / IU / ED / EI / 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

Applications

- Selection of appropriate hardware based on application
- Repair and maintenance of PC's
- Plan, analyze, design, install, configure, test, implement and maintain networking systems

Procedure

Learning architectural details	<ul style="list-style-type: none"> • Write everything down • Do the easy stuff first • Check for operator error • Check the software • Check external signals • Run diagnostic programs 	Repairing the different components of PC by using different methods	Follow step by step procedure to install TCP/IP Protocols and TCP/IP configuration	Testing and troubleshooting of network connectivity	Network configuration, installation and maintenance Network utilities
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Principle

Logic of components	Rules of troubleshooting	Rules of repairing	Principle of TCP/IP reference model	Principle of OSI reference model
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Concept

Motherboard, drive formatting, latency, landing zone, HDD, FDD, Active, Passive, modular motherboard	Error codes, memory package, styles and structures, memory signals, memory manager, disk manager, EZ-Drive, DMI, SCSI, Video adapter etc.	Types of Topology LAN, WAN, MAN	Types of Network devices	Types of Transmission media
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Facts

AT, ATX, motherboard, AGP, PCI Port etc.	Problems of system boards, display problems	Tools for repairing the faults, types of tests	Computer Network and Benefits	Classification of Network	Network Features
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Theory:

Chapter	Topic and Contents	Hours	Marks
01	<p>Topic 1] Motherboard and Peripherals</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ 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 <p>Contents:</p> <ul style="list-style-type: none"> • 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	<p>Topic 2] Power Supply and Interfaces</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Select, identify, measure and troubleshoot power related problems ➤ Differentiate online and offline UPS. ➤ Identify, select and use different interfaces <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Block diagram and working of SMPS, Signal description and pin diagram of ATX power supply. • UPS : Block diagram working, Types, Rating <p>2.2</p> <ul style="list-style-type: none"> • USB features and operation, RS232: Voltages & 9 pin Signal description. 	04	06
03	<p>Topic 3] Diagnostic, Testing and Maintenance</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Identify importance of preventive maintenance ➤ Realize the need of practices of preventive maintenance of peripheral <p>Contents:</p> <ul style="list-style-type: none"> • Maintenance : Preventive and passive maintenance • Preventive maintenance of peripherals of PCs: Mouse, keyboard, hard disk, CDROM drive, laser printer, scanner. 	04	08

	<ul style="list-style-type: none"> • PC problems and troubleshooting, POST. 		
04	<p>Topic 4] Introduction to Networks Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Classify types of networks ➤ Plan and design network ➤ Install, configure and use networking devices ➤ Test and maintain networks <p>Contents:</p> <ul style="list-style-type: none"> • 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	<p>Topic 5] Networking Devices and Reference Models Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Understand layered approach ➤ Compare TCP-IP and OSI models ➤ Setup and configure network in laboratory environment <p>Contents:</p> <ul style="list-style-type: none"> • 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, their 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, disassemble 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, their 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 their 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.

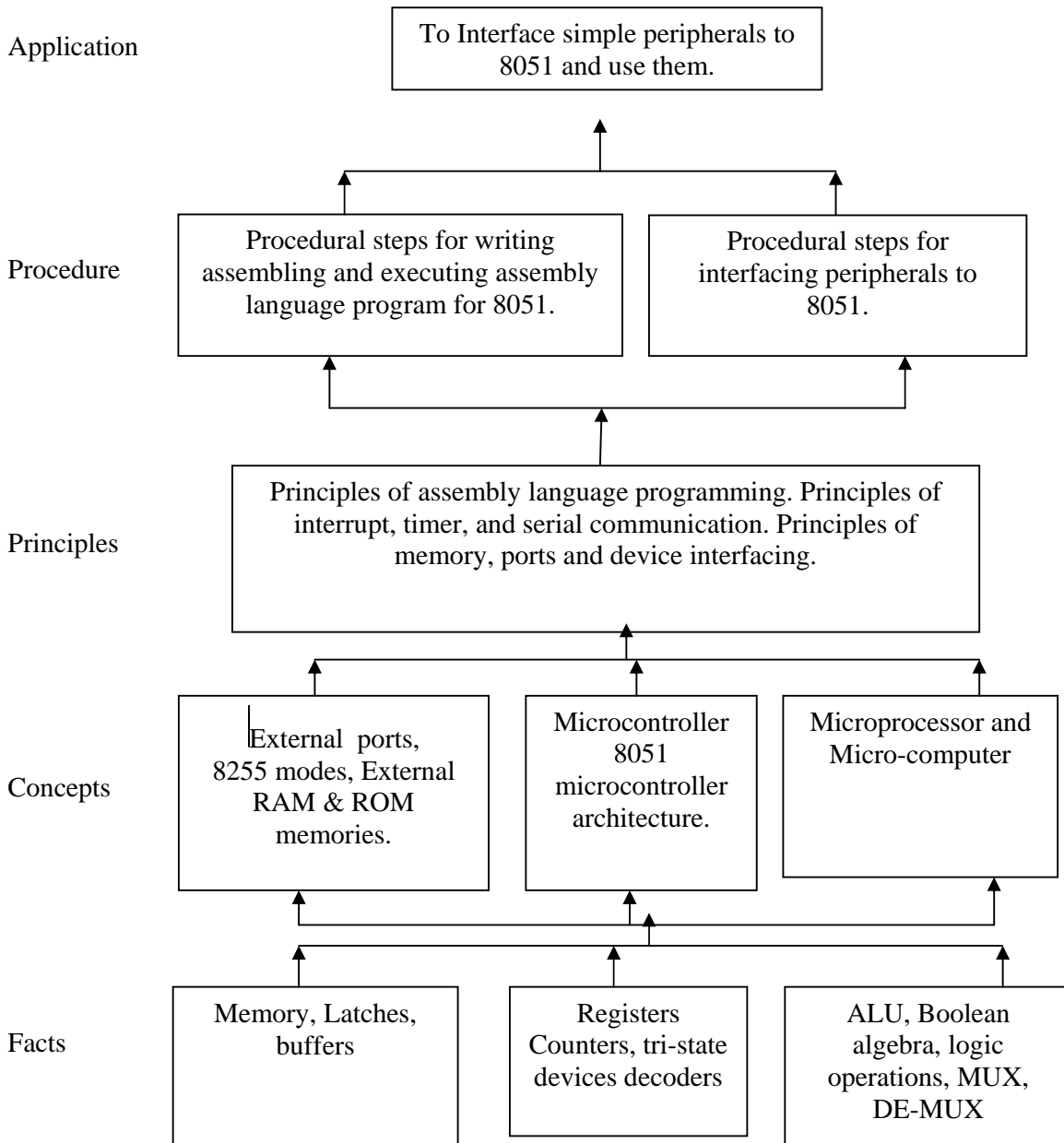
The student will gain the knowledge of peripheral interfacing and programming them. Microcontroller is in built element of embedded system. The subject will help the students to study concepts of embedded system. It will also help to understand design of simple microcontroller systems.

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
<p>Topic 1: Introduction to Microcomputers and Microcontrollers</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Distinguish microcomputer, microprocessor, and microcontroller <p>Contents:</p> <p>1.1 Introduction to single board microcomputer. (Marks 04)</p> <ul style="list-style-type: none"> • Block Diagram of Microcomputer. • Elements of Microcomputer. (Buses, Microprocessor, memory, I/O devices). • Different types of buses: address, Data, and control bus <p>1.2 Introduction to Microcontroller (Marks 06)</p> <ul style="list-style-type: none"> • 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
<p>Topic 2: 8051 Microcontroller</p> <ul style="list-style-type: none"> ➤ 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. <p>Contents :</p> <p>2.1 8051 architecture (Marks 10)</p> <ul style="list-style-type: none"> • Features, Architecture, Pin description. <p>2.2 Special Features of 8051 (Marks 06)</p> <ul style="list-style-type: none"> • Boolean Processor, Power saving options- idle and power down mode, Derivatives of 8051. 	08	16
<p>Topic 3: 8051 Instruction set and programming</p> <ul style="list-style-type: none"> ➤ Comprehend addressing modes and instruction set. ➤ Develop and realize assembly language programs. <p>3.1 Addressing modes and instruction set. (Marks 10)</p> <ul style="list-style-type: none"> • Assembler directive- ORG, DB, EQU, END, CODE, DATA <p>3.3 Assembly language programming (Marks 10)</p> <p>3.4 Software development cycle- Editor, Assembler, cross compiler, linker, locater, compiler (Marks 04)</p>	12	24

<p>Topic 4: MCS 51 Interrupt and timers</p> <ul style="list-style-type: none"> ➤ Realize Concept of Interrupts, timer, and related SFRs ➤ Use timers and Interrupts through programs ➤ Compare interrupts and polling method. <p>Contents:</p> <p>4.1 8051 Timer/counter (Marks 12)</p> <ul style="list-style-type: none"> • Timer / Counter logic and modes • Simple programs on timer to generate time delay using polling and interrupt method. <p>4.2 8051 Interrupts (Marks 10)</p> <ul style="list-style-type: none"> • Interrupts and polling. • SFR - IE, IP • Simple programs based on interrupts and polling method 	10	22
<p>Topic 5: Serial Communication and parallel ports:</p> <ul style="list-style-type: none"> ➤ Comprehend Serial and parallel communication <p>Contents:</p> <p>5.1 Serial port of 8051</p> <ul style="list-style-type: none"> • Serial Communication-SCON, SBUF • Modes of serial communication • Simple programs for serial communication. • I/O port structure & its Programming. 	06	12
<p>Topic 6: Memory and I/O interfacing</p> <ul style="list-style-type: none"> ➤ Interface I/O devices and memory devices ➤ Expand memory and I/O <p>Contents:</p> <p>6.1 Memory Interfacing: (Marks 06)</p> <ul style="list-style-type: none"> • Interfacing External RAM and ROM <p>6.2 I/O Interfacing: (Marks 10)</p> <ul style="list-style-type: none"> • 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-Gelispé-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.

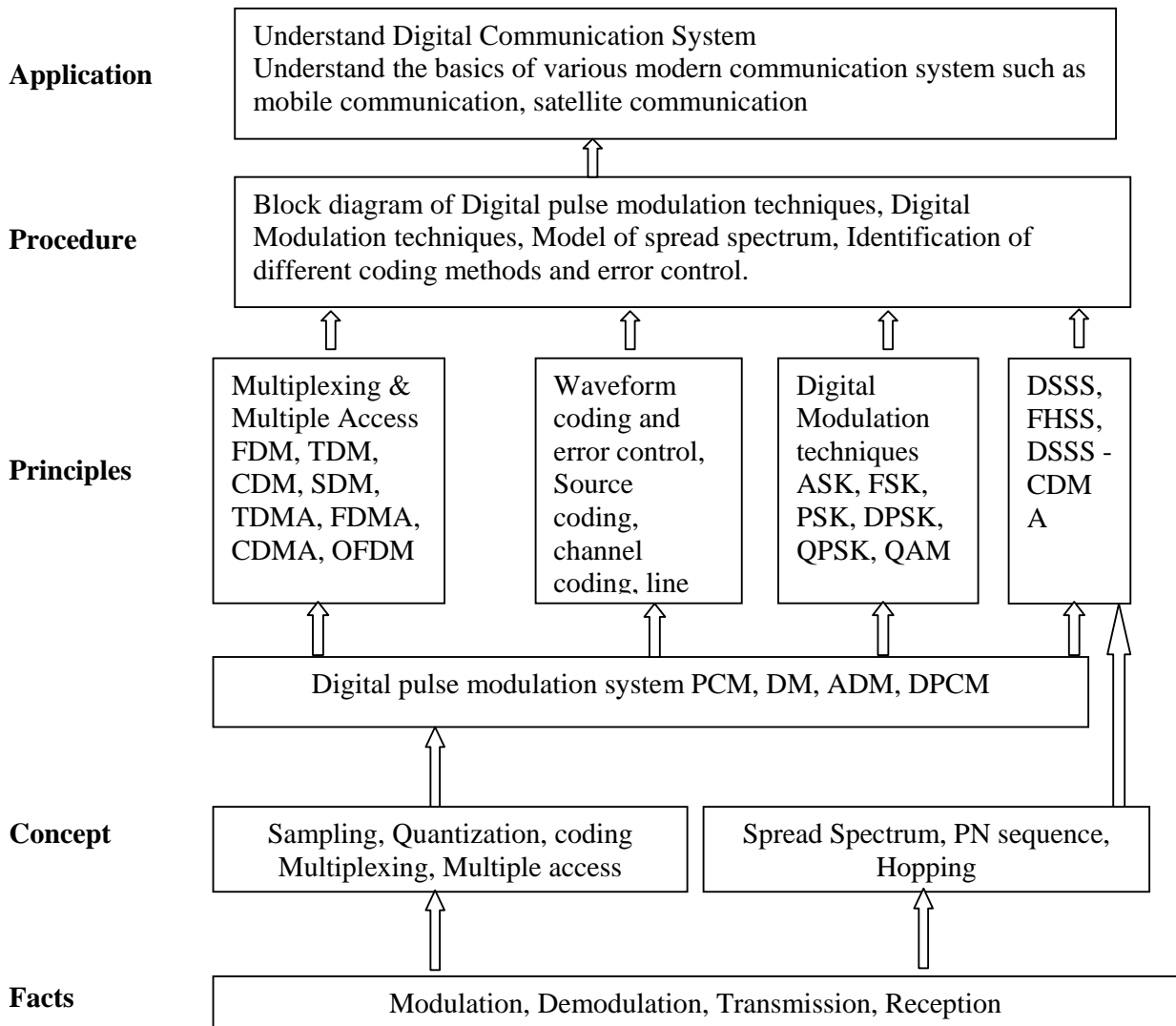
This subject familiarizes the student with digital information theory, information rate and channel capacity. This subject helps the students to understand the concept of principles of digital modulation technique, channel coding method and error control multiplexing, Multiple Access scheme and spread 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
<p>Topic 1: Introduction of Digital Communication</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define Digital Communication, communication channel ➤ Explain different element of Digital Communication. ➤ Compare analog. with digital communication <p>Contents:</p> <ul style="list-style-type: none"> • 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
<p>Topic 2: Digital Pulse Modulation Techniques.</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define and explain, generation and demodulation of various digital pulse modulation techniques. ➤ Define Sampling theorem ➤ Compare digital pulse modulation with analog modulation <p>Contents:</p> <p>2.1 [04 Marks]</p> <ul style="list-style-type: none"> • Sampling process Nyquist sampling theorem. • Quantization process , Quantization error, Quantization noise, Uniform ,Non Uniform Quantization (companding) u law, A law (concept) <p>2.2 [16 Marks]</p> <ul style="list-style-type: none"> • 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
<p>Topic 3: Coding Methods and Error Control.</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ 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. <p>Contents:</p> <p>3.1 [06 Marks]</p> <ul style="list-style-type: none"> • Bits, bit rate and baud rate, Hartleys law, Shannon Hartleys theorm, Channel capacity. 	08	16

<p>3.2</p> <ul style="list-style-type: none"> Source coding, sources, Entropy, baudot code, Huffman coding. [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. 		
<p>Topic 4: Digital Modulation Technique. Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define M- ary encoding ➤ Explain various transmitter & receiver for digital communication ➤ Compare various digital modulation techniques. ➤ Draw constellation and proper diagram. <p>Contents:</p> <ul style="list-style-type: none"> 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
<p>Topic 5: Multiplexing & Multiple Access. Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define FDM , TDM , CDM SDM ➤ Explain multiple access system like FDMA , TDMA , CDMA , SDMA ➤ Compare OFDM , and CDMA <p>Contents:</p> <p>5.1 [10 Marks]</p> <ul style="list-style-type: none"> 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) <p>5.2 [10 Marks]</p> <ul style="list-style-type: none"> 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

<ul style="list-style-type: none"> 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 		
<p>Topic 6: Spread Spectrum Modulation</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define PN sequence ➤ Explain Spread Spectrum modulation s DSSS & FHSS ➤ Sate Applications of S.S modulation <p>Contents:</p> <p>6.1 [06 Marks]</p> <ul style="list-style-type: none"> 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 <p>6.2 [08 Marks]</p> <ul style="list-style-type: none"> 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=117101051> digital communication lecture series
3. <http://educyclopedia.karadimov.info/electronics/javamodulationdig.htm> FDMA, TDMA, CDMA, FSK, PAM etc Animations
4. <http://educyclopedia.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.

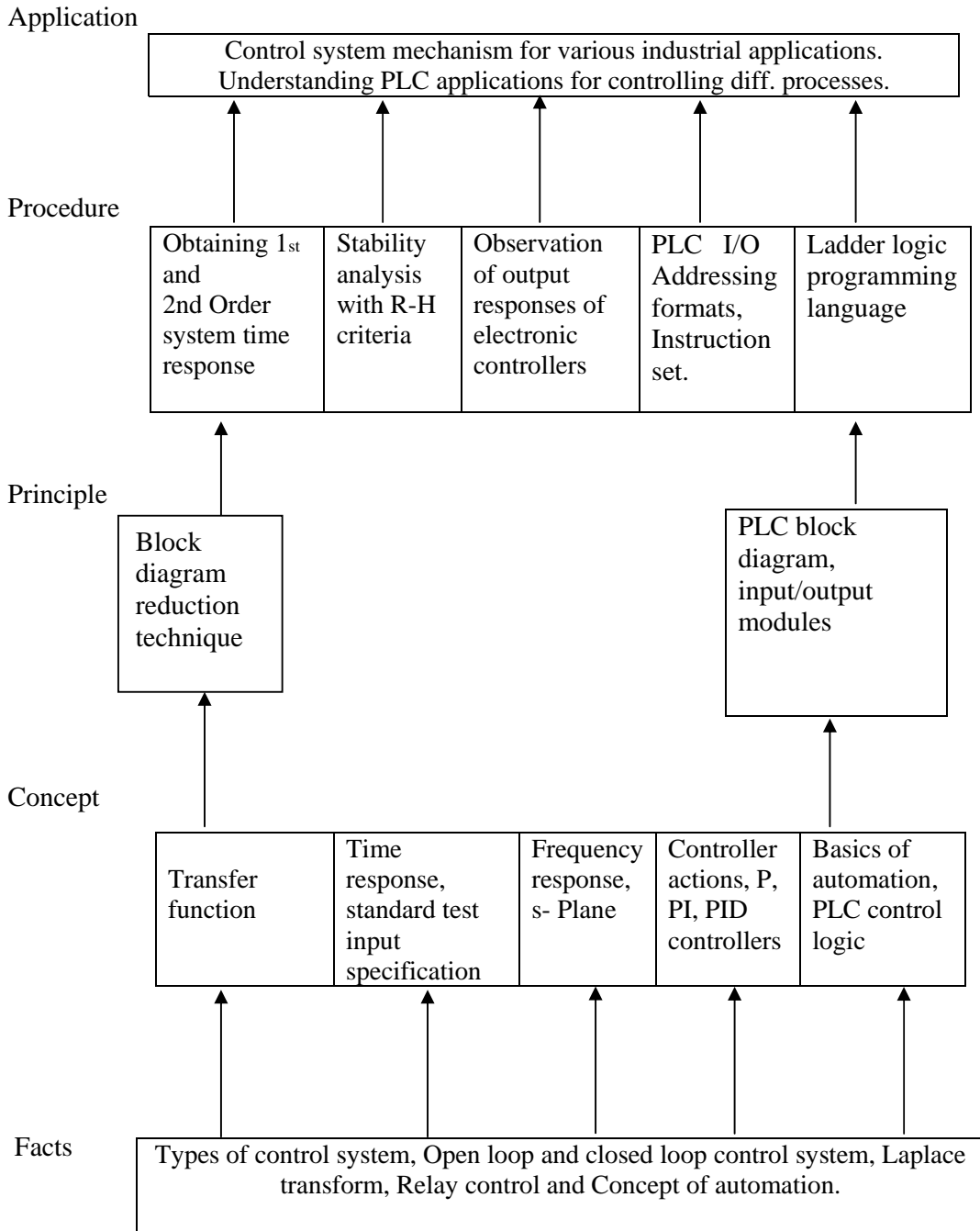
The subject intends to teach the student different control systems used in various field like automobile industry in application such as pick and place, welding, spray painting etc. The subject introduces the common industrial control system elements such as Programmable logic controller.

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
<p>Topic 1: Introduction to the Control System</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Explain different types of control system ➤ Develop transfer functions ➤ Differentiate between 1st & 2nd order of system ➤ Develop and solve block diagram of control system <p>Contents:</p> <p>1.1 [4 Marks]</p> <ul style="list-style-type: none"> • 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. <p>1.2 [4 Marks]</p> <ul style="list-style-type: none"> • 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. <p>1.3 [8 Marks]</p> <ul style="list-style-type: none"> • Order of a system: Definition, 0, 1, 2 order system standard equation, practical examples. • Block diagram reduction technique: Need, reduction rules, problems. 	08	16
<p>Topic 2: Time Response Analysis</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ 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 <p>Contents:</p> <p>2.1 [4 Marks]</p> <ul style="list-style-type: none"> • 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 <p>2.2 [8 Marks]</p> <ul style="list-style-type: none"> • 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 <p>2.3 [8 Marks]</p> <ul style="list-style-type: none"> • Time response specifications (no derivations) 	12	20

<p>Tp,Ts,Tr,Td,Mp,ess. Problems on time response specifications</p> <ul style="list-style-type: none"> • Steady state analysis: Type 0,1,2 systems, Steady state error & error constants, numerical Problems 		
<p>Topic 3: Stability Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Appreciate the importance of stability ➤ Analyze different types of stability ➤ Apply Routh's stability criterion for stability analysis and solve the numerical. <p>Contents:</p> <p>3.1 [4 Marks]</p> <ul style="list-style-type: none"> • 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. <p>3.2 [8 Marks]</p> <ul style="list-style-type: none"> • Routh's Stability Criterion: Different cases & conditions (statement method), Numerical Problems 	06	12
<p>Topic 4: Control Actions Specific Objectives:</p> <ul style="list-style-type: none"> ➤ 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 <p>Contents:</p> <p>4.1. [4 Marks]</p> <ul style="list-style-type: none"> • Process control system: Block diagram & explanation of each block. <p>4.2. Control actions [8 Marks]</p> <ul style="list-style-type: none"> • 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
<p>Topic 5: PLC Fundamentals Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Explain the basics of PLC. ➤ Draw functional block diagram of PLC. <p>Contents:</p> <p>5.1 [4 Marks]</p> <ul style="list-style-type: none"> • Evolution of PLC in automation, need and benefits of PLC in Automation. <p>5.2 [12 Marks]</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ➤ Explain the details of diff. I/O modules of PLC. ➤ Get familiar with the instruction set of PLC system. ➤ Develop PLC programming skills. Contents: <p>6.1. [8 Marks]</p> <ul style="list-style-type: none"> • 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. <p>6.2. [16 Marks]</p> <ul style="list-style-type: none"> • 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.

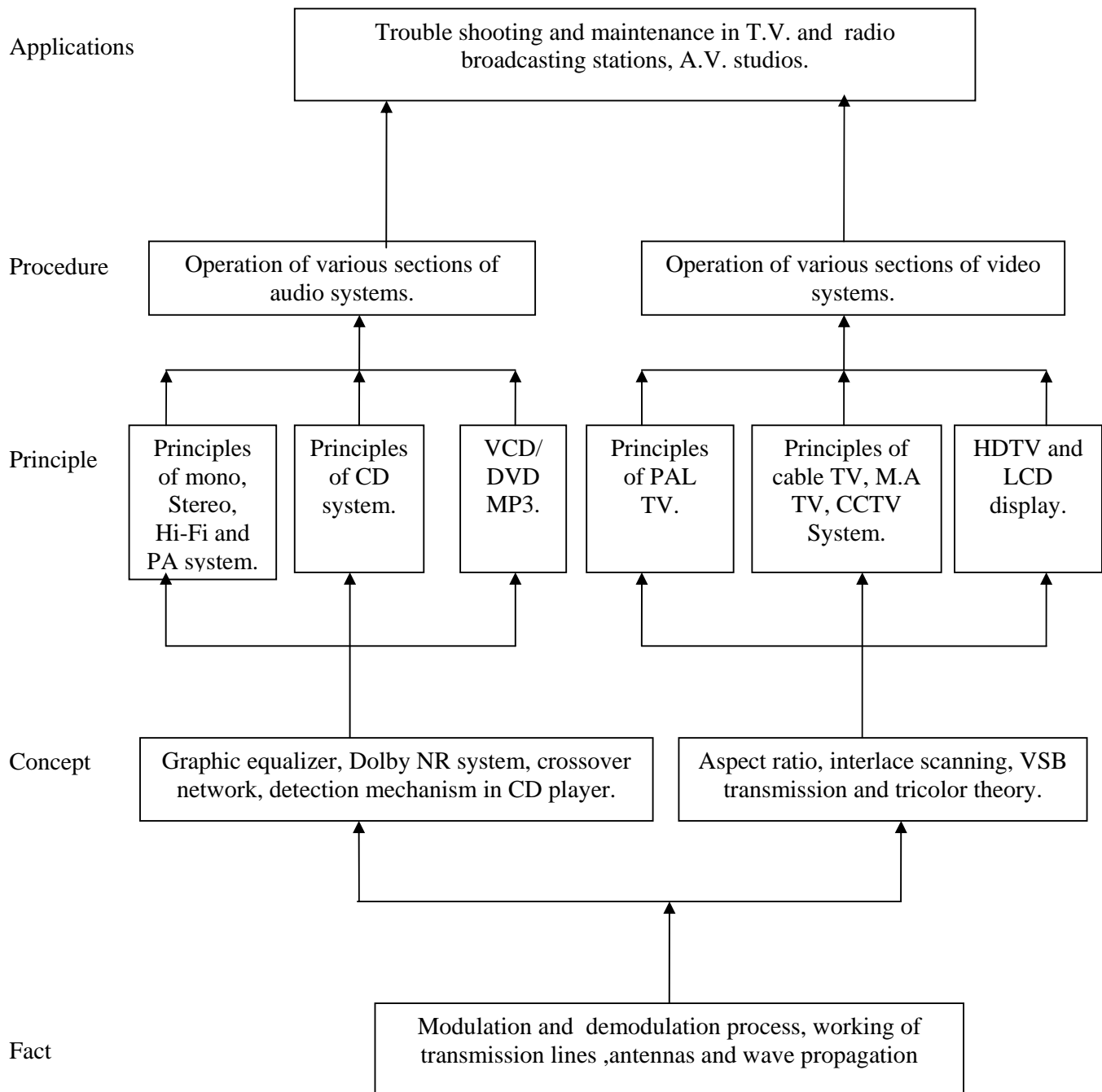
The topic on cable TV explains how the TV signals are collected from different sources, mainly satellite and on due processing distributed from cable station to subscribers over the cable network.

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
<p>Topic 1] Hi Fi Audio Amplifier Specific Objectives: Students will be able to</p> <ul style="list-style-type: none"> ➤ 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 <p>Contents:</p> <ul style="list-style-type: none"> • 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
<p>Topic 2] CD player Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe the principle of detection mechanism of CD player ➤ List the components used in CD mechanism <p>Contents:</p> <ul style="list-style-type: none"> • 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
<p>Topic 3] TV Fundamentals Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define various terms used in TV system ➤ Draw and label composite video signal wave-forms ➤ State CCIR-B standards for TV system <p>3.1 [08 Marks]</p> <ul style="list-style-type: none"> • 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. <p>3.2 [08 Marks]</p> <ul style="list-style-type: none"> • Colour theory, primary colours and secondary colours Grassman's law, additive Colour mixing subtractive Colour mixing. <p>3.3 [08 Marks]</p> <ul style="list-style-type: none"> • 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

<p>TOPIC 4] TV Transmitter and Receiver</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ 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. <p>Contents:</p> <p>4.1 [04 Marks]</p> <ul style="list-style-type: none"> • Audio and Video signal transmission using AM and FM modulation. • Positive and Negative modulation, Merits and Demerits of Negative modulation. <p>4.2 [08 Marks]</p> <ul style="list-style-type: none"> • 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 <p>4.3 [08 Marks]</p> <ul style="list-style-type: none"> • Block diagram of Colour TV transmitter. • Block Diagram and operation of color TV receiver (PAL D type) 	09	20
<p>Topic 5] Colour TV</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ 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 <p>Contents:</p> <p>5.1 [12 Marks]</p> <ul style="list-style-type: none"> • 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. <p>5.2 [04 Marks]</p> <ul style="list-style-type: none"> • HDTV: Development of HDTV, NHK MUSE System and NHK Broadcast. <p>5.3 [04 Marks]</p> <ul style="list-style-type: none"> • LCD/LED Technology: Principle and working of LCD and LED TV systems. 	12	20

<p>Topic 6] Cable Television Specific Objectives:</p> <ul style="list-style-type: none"> ➤ 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 <p>6.1 [06 Marks]</p> <ul style="list-style-type: none"> • 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. <p>6.2 [08 Marks]</p> <ul style="list-style-type: none"> • 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 Praticce (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.

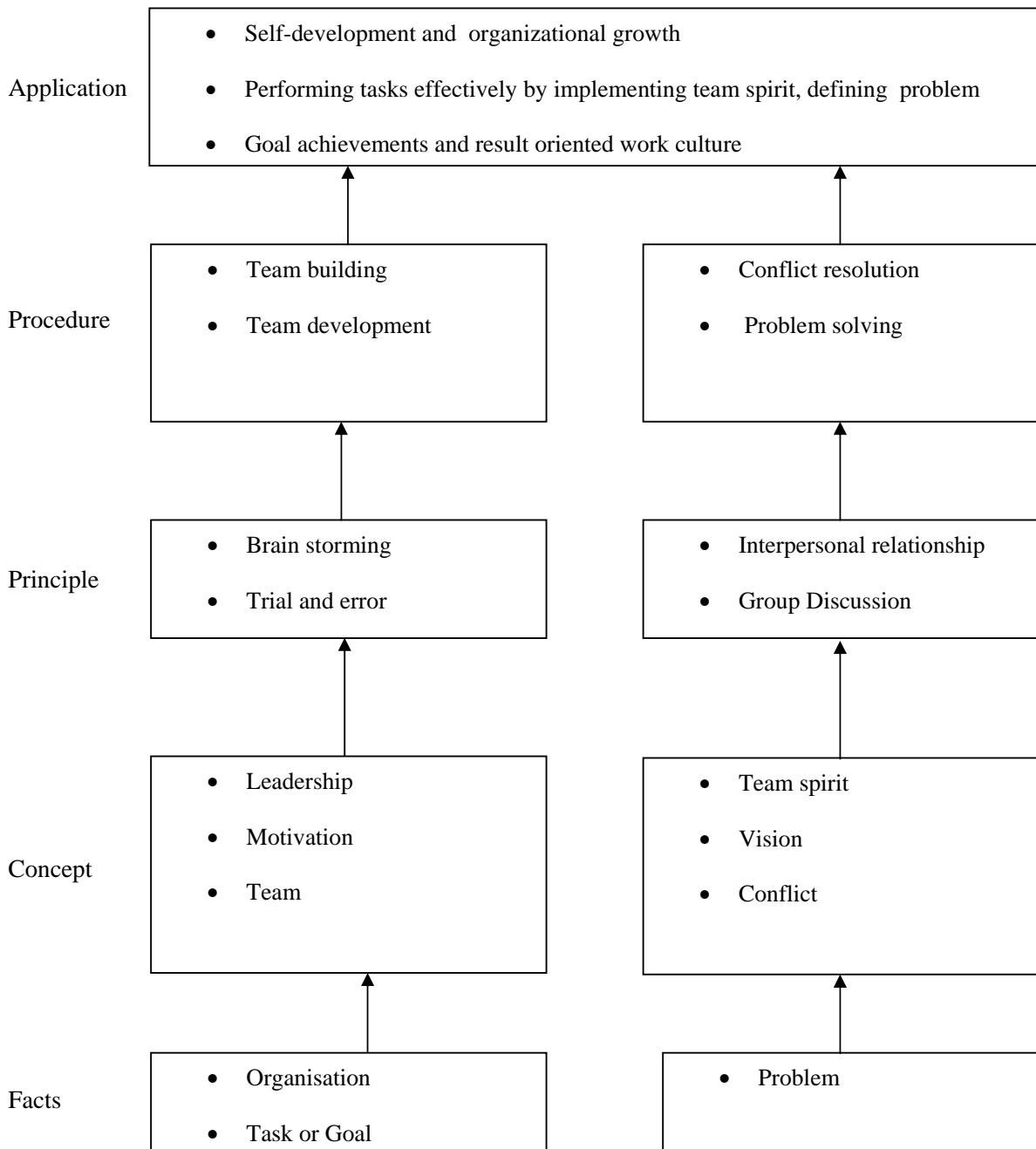
This subject of 'Behavioural Science' provides a broad base in which a technician can develop a successful career in the world of work.

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
<p>TOPIC 1: LEADERSHIP</p> <p>Contents:</p> <ol style="list-style-type: none"> 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
<p>TOPIC 2: MOTIVATION</p> <p>Contents:</p> <ol style="list-style-type: none"> 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
<p>TOPIC 3: TEAM BUILDING</p> <p>Contents:</p> <ol style="list-style-type: none"> 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
<p>TOPIC 4: CONFLICT RESOLUTION</p> <p>Contents:</p> <ol style="list-style-type: none"> 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
<p>TOPIC 5: PROBLEM SOLVING AND DECISION MAKING</p> <p>Contents:</p> <ol style="list-style-type: none"> 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
<p>TOPIC 6: GROUP DISCUSSION AND INTERVIEW TECHNIQUES</p> <p>Contents:</p> <ol style="list-style-type: none"> 6.1 GROUP DISCUSSION <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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:

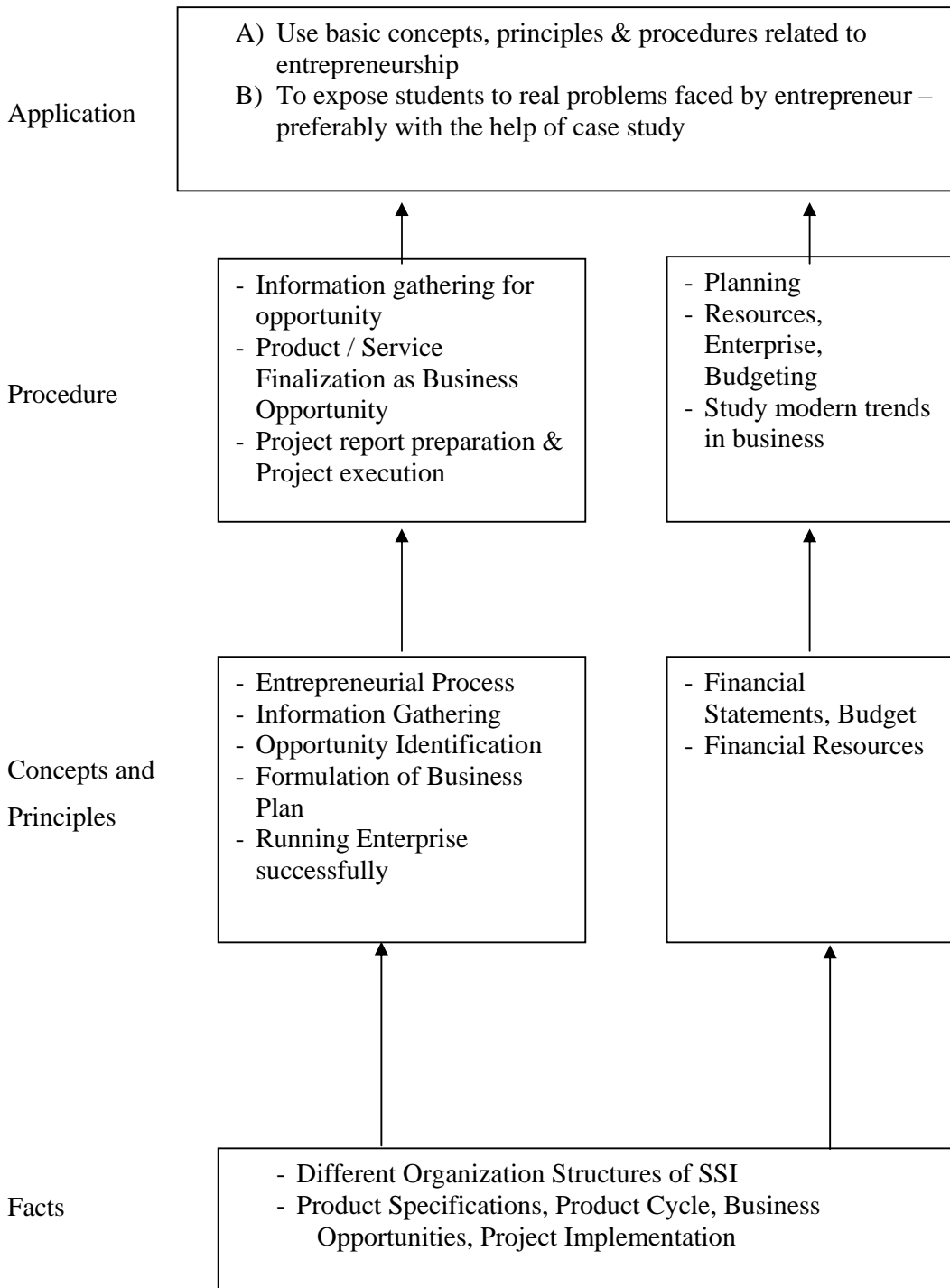
Globalization, liberalization & privatization along with revolution in Information Technology, have thrown up new opportunities that are transforming lives of the masses. Talented and enterprising personalities are exploring such opportunities & translating opportunities into business ventures such as- 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
2	Assessing Entrepreneurial Competencies	Ahmedabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 ,
3	Business Opportunity Selection and Guidance	Gujrat,India P.H. (079) 3969163, 3969153
4	Planning for completion & Growth	E-mail :
5	Problem solving-An Entrepreneur skill	ediindia@sancharnet.in / olpe@ediindia.org Website : http://www.ediindia.org

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
--	--	03	--	--	--	--	50@	50

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:

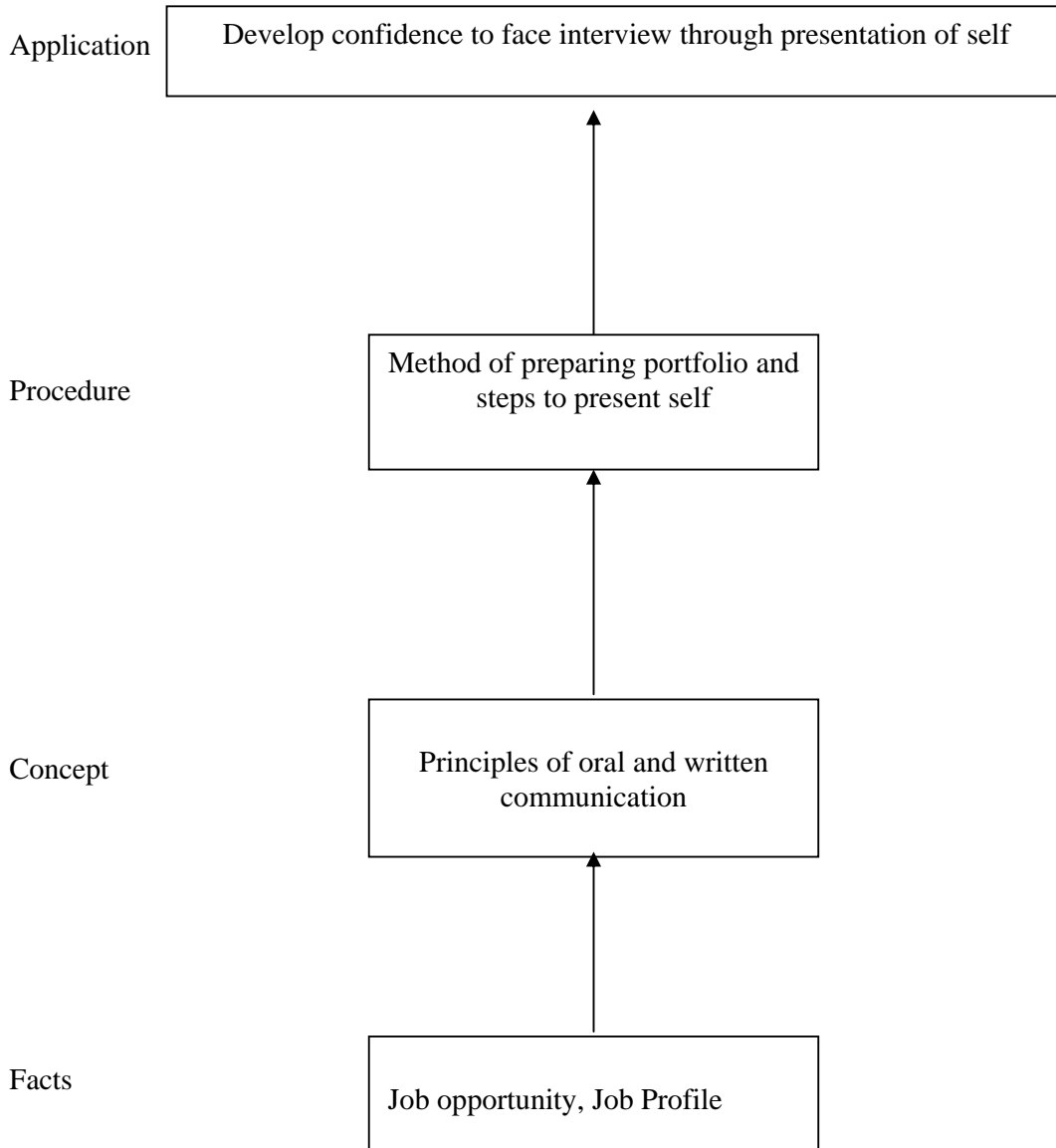
Intellectual Skills:

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	<p>Industrial Visits</p> <p>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.</p> <p>The industrial visits may be arranged in the following areas / Industries.</p> <ul style="list-style-type: none"> • Satellite earth station • Radar Establishment • Mobile Telephone Office • Any other relevant area 	16
2	<p>Lectures by Professional / Industrial Expert to be organized from the following areas.</p> <ul style="list-style-type: none"> • 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	<p>Information Search:</p> <p>Students should prepare report as a part of term work of searching and collecting the information regarding their final project/industrial project</p>	06
4	<p>Seminar</p> <p>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</p>	10
5	<p>Group Discussion</p> <p>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.</p> <p>The Faculty may suggest the topic for group discussion</p>	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.

Course Name : Diploma in Instrumentation / Diploma in Instrumentation & Control / Diploma in Industrial Electronics
Course Code : IC/IS/IE
Semester : Fifth
Subject Title : Control System
Subject Code : 17538

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:

Modern civilization is an indication of human Endeavour to control nature's forces and to harness them for the benefit to mankind. The laws of nature are such that everything in this universe is controlled. 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.

This subject is beneficial for process control variation in any process control industry which equips the students for maintenance and quality analysis.

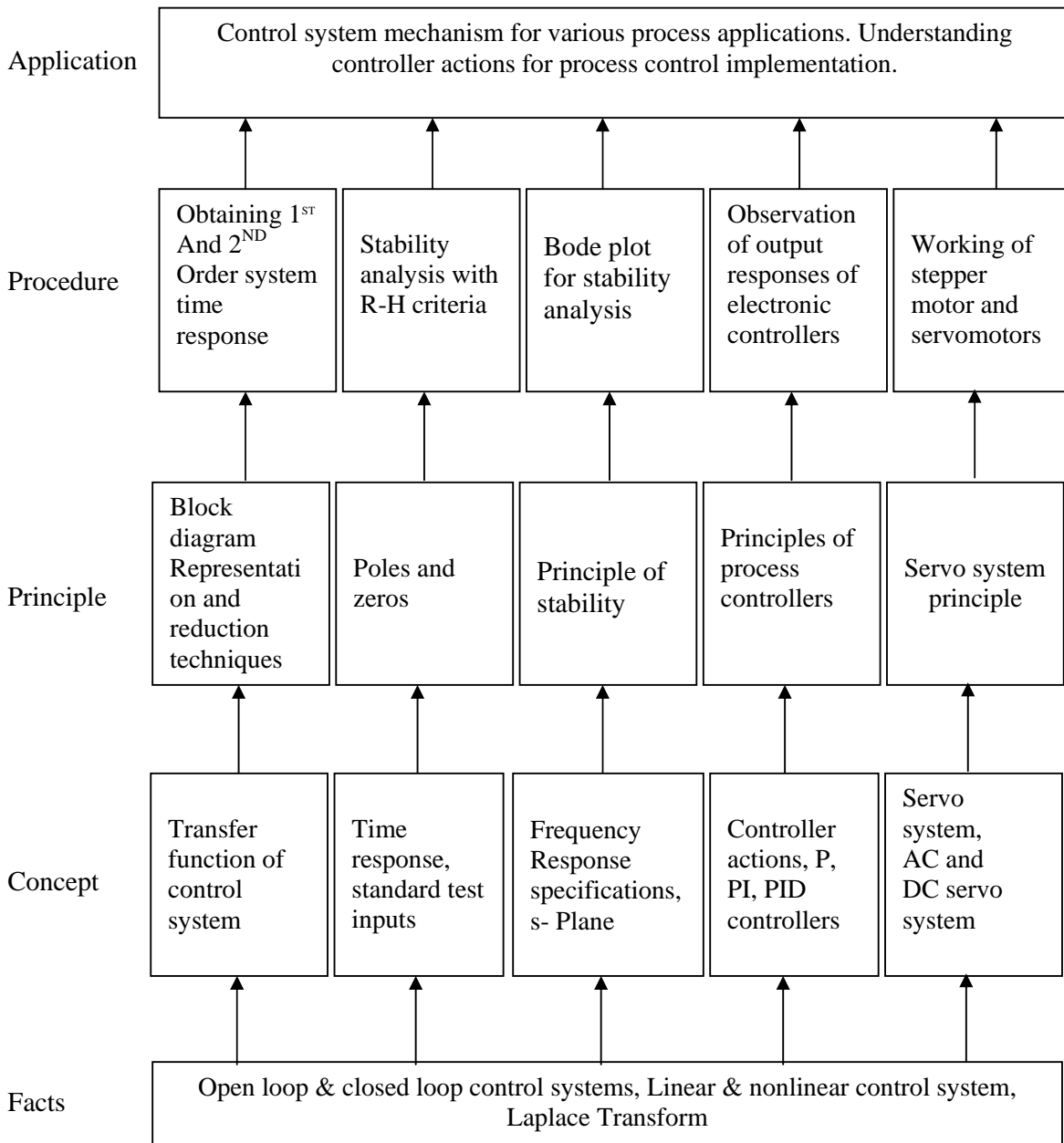
General Objectives:

The student will be able to:

1. Learn the classifications of control system.
2. Understand Steady state, time response, and frequency response analysis.
3. Learn Stability analysis with RH criteria and Bode plot.
4. Understand Servo system and its application.

5. Learn the Process control system and controllers.

Learning Structure:



Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction to the control system</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Develop transfer functions ➤ Differentiate between 1st & 2nd order of system ➤ Develop and solve block diagram of control system <p>Contents:</p> <p>1.1 [8 Marks]</p> <ul style="list-style-type: none"> • Control system: Definition and practical examples • Classifications: Open loop & closed loop systems – definition, block diagram, practical example and Comparison; Linear and non linear system; Time variant and time invariant systems. • Laplace Transform: Laplace Transform for standard functions • Transfer function: Definition, Derivation of transfer functions for closed loop & open loop control system, Differential equations & Transfer functions of R-C and R-L-C electrical circuits. <p>1.2 [8 Marks]</p> <ul style="list-style-type: none"> • Order of a system: Definition 0, 1, 2 order system, standard equations, simple numericals • Block diagram reduction technique: Need, reduction rules, numerical problems. 	08	16
<p>Topics 2: Time -response analysis</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Differentiate between transient and steady state responses ➤ Appreciate the importance of standard inputs and apply them in analysis of control system ➤ Represent poles and zeros in s-plane ➤ Analyze 1st & 2nd order control system for step input <p>Contents:</p> <p>2.1 [12 Marks]</p> <ul style="list-style-type: none"> • Time domain analysis: Transient and steady state response • Standard test inputs: Step, ramp, parabolic & impulse: Need of them, significance, and corresponding Laplace representation • Poles & zeros: Definition, S-plane representation • 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 <p>2.2 [12 Marks]</p> <ul style="list-style-type: none"> • Time response specifications (no derivations) T_p, T_s, T_r, T_d, M_p, e_{ss}; numerical Problems • Steady state analysis: Type 0,1,2 systems, Steady state error & error constants, numerical Problems 	12	24
<p>Topics 3: Stability</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Appreciate the importance of stability 	08	16

<ul style="list-style-type: none"> ➤ Analyze different types of stability ➤ Apply Routh's stability criterion for stability analysis <p>Contents:</p> <ul style="list-style-type: none"> • 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. • Routh's stability criterion: Different cases & conditions (statement method), Numerical Problems. 		
<p>Topics 4: Frequency Response</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ List frequency response specifications ➤ Draw Bode plot ➤ Analyze stability from Bode plot <p>Contents:</p> <p>4.1. [4 Marks]</p> <ul style="list-style-type: none"> • Frequency response analysis: Introduction, advantages & disadvantages; Frequency response specifications. <p>4.2. Bode plot: [6 Marks]</p> <ul style="list-style-type: none"> • Need of Bode plot • <u>Straight line</u> Magnitude plot • <u>Straight line</u> Phase angle plot • Bode plot for gain K, poles & zeros at origin, 1ST order <u>poles system</u> (<u>1/(as+c)</u>) & <u>zeros</u> • Analyze stability from Bode plot <u>using Gain margin and Phase margin</u>. 	08	10
<p>Topics 5: Process Control and Control actions</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Differentiate between different types of Control actions such as P,I & D ➤ Describe composite controllers such as PI, PD, PID controllers <p>Contents:</p> <ul style="list-style-type: none"> • Process control system: Block diagram & explanation of each block. • Control actions: <ul style="list-style-type: none"> ▪ 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 graph of P,I & D controllers ▪ Composite controllers: PI, PD, PID controllers- O/P Equations, Response, Comparison, Application, Electronic op-amp based circuits 	06	16
<p>Topics 6: Servo System</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define servo systems ➤ Draw the constructional sketches of servo components. servomotor 	06	18

Contents:		
6.1. [4]		
<ul style="list-style-type: none"> • Servo system: Definition, block diagram • AC & DC servo systems: Concept and principle, Comparison, schematic diagram. 		
6.2. Servo components: [14]		
Draw, describe the working and state the applications of following		
<ul style="list-style-type: none"> • Potentiometer as error detector • Synchro as error detector • Stepper motor- PM & variable reluctance type, comparison of stepper motor with DC servo motor • DC servo motor- characteristic, difference from a normal DC motor • AC servo motor- characteristic, difference from a normal 2 phase induction motor, 		
Total	48	100

Practical:**Skills to be developed:****Intellectual Skills:**

- Reading and interpretation of the graph.
- Interpretation of the results from observations and calculations.
- Use of these results for analyzing the problems

Motor Skills:

- Proper handling of instruments.
- Measuring physical quantities accurately.
- Observe the phenomenon and to list the observations in proper tabular form.
- Adopt proper procedure while performing the experiment.

List of Practicals:

1. Measurement and control of error of angular position of DC Servo system.
2. Measurement and control of error of angular position of AC Servo system.
3. Characteristics of potentiometer as error detector.
4. Characteristics of Synchro as error detector.
5. Generate the pulses and measure the speed of stepper motor.
6. Step response of first order R-C circuit.
7. Step response of first order R-L-C circuit.
8. Type 0 system analysis for step, ramp & parabolic inputs.
9. Measurement & control of temperature (or any other parameter) with on-off controller.
10. Measurement & control of temperature (or any other parameter) with Proportional controller.
11. Measurement & control of temperature (or any other parameter) with PI controller.
12. Measurement & control of temperature (or any other parameter) with PID controller.

Learning Resources:**1. Books:**

Sr. No.	Author	Title	Publisher
1	I.J. Nagrath & M. Gopal	Control System Engineering	McGraw-Hill
2	Anand Kumar	Control Systems	PHI
3	K.R. Varmah	Control Systems	McGraw-Hill
4	K. Ogata	Modern Control Engineering	PHI
5	C. D. Johnson	Process Control Instrumentation Technology	Prentice hall

2. Websites:

www.servosystems.com

en.wikipedia.org/wiki/Servomechanism

en.wikipedia.org/wiki/PID_controller

Course Name : Diploma in Industrial Electronics
Course Code : IE / IU
Semester : Fifth for IE and Sixth for IU
Subject Title : Industrial Electronics and Applications
Subject Code : 17541

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:

Different power devices play vital role in the power generation and transmission as well as in industrial applications. This subject deals with power converters and power control and advanced electronics applications.

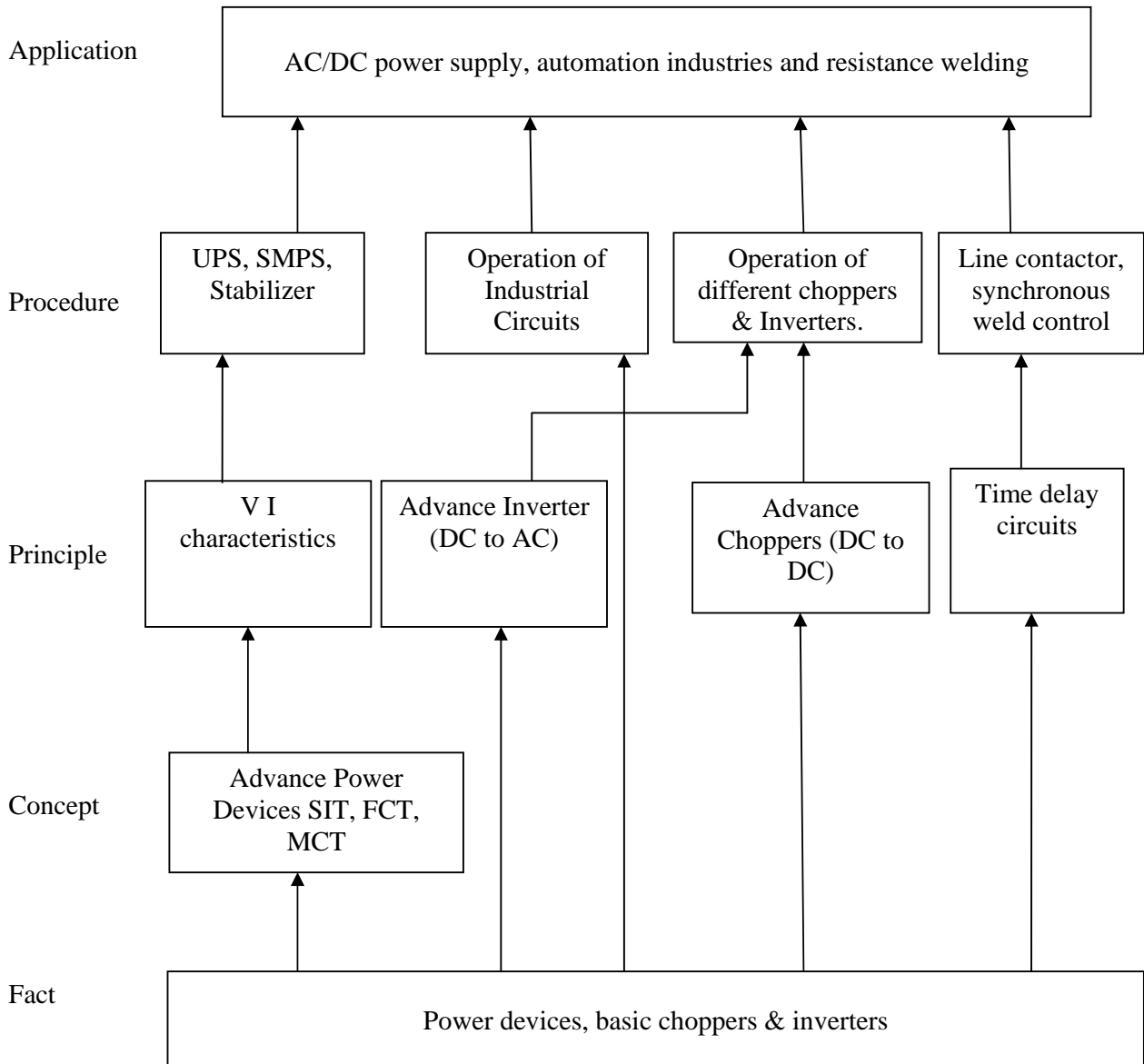
The subject includes applications of power devices in controlling different parameters in industrial automation such as converters, inverters, a. c. stabilization and power control circuits and various applications.

General Objectives:

Students will be able to

- 1) Realize applications of various power devices
- 2) Understand the operation of different power converters, inverters, choppers & regulators.
- 3) List applications of converters, inverters, choppers & regulators
- 4) Select proper power device and related power controllers for a specific application.

Learning Structure



Contents: Theory

Topics and Contents	Hours	Marks
<p>Topic 1: Modern Power Devices & Protection Circuits</p> <p>Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Realize construction and working of different power devices ➤ Classify different power devices ➤ Identify proper power devices for particular applications <p>Contents :</p> <ul style="list-style-type: none"> • Power devices: SIT, MCT and FCT. Symbol, construction, working and V-I characteristics • Need of Protection Circuits for power devices • Voltage suppression diodes, reverse recovery time. • Snubber Circuits:- Operating principle & need of Snubber circuits. • Over current Protection Circuits. • Over voltage Protection Circuits. • di/dt protection circuit. • dv/dt protection circuit. • Series & parallel connections of SCR. Need of series & parallel connection of SCR, equalising circuit ,protection circuit. 	08	16
<p>Topic 2: Advanced Choppers</p> <p>Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Realize the working of different chopper with associated waveforms ➤ Classify choppers. ➤ Identify proper chopper. <p>Contents :</p> <ul style="list-style-type: none"> • Review of basic step up & step down Choppers (no marks) • Effect of duty cycle on output voltage. • Classification of choppers on the basis of Quadrant, Circuit diagram using SCR and MOSFET, mode of operation, wave forms Single quadrant (class A ,class B) Two Quadrant (class C, class D) and Four Quadrant (class E) • Jones Chopper, Morgans Chopper Circuit diagram using SCR, working, wave forms. 	08	16

<p>Topic 3: Advanced Inverters Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Realize the working of different Inverters & cycloconverter with associated waveforms ➤ Classify different Inverters & cycloconverters. ➤ Identify proper chopper & inverter <p>Contents :</p> <ul style="list-style-type: none"> • Review of basic Inverter(no marks) • Types based on energy source: Voltage Source , Current Source Inverter • Types based on configuration: Bridge Inverter: Half Bridge , Full Bridge & Push pull Inverter with R & RL load Circuit Diagram ,Working and Waveforms • Series inverter , parallel inverter-circuit diagram,working,waveform. • Mc Murray Inverter, Mc Murray Bed Ford Inverter Circuit diagram, Working • Resonant Inverters, Output voltage & Harmonics Control using PWM control methods -block diagram & waveform • Cycloconverter-single phase cycloconverter. 	10	20
<p>Topic 4: AC voltage stabilizer Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Realize concept of voltage stabilization ➤ Classify different stabilizer ➤ Specify different stabilizer ➤ Compare different stabilizer <p>Contents :</p> <ul style="list-style-type: none"> • Need of Stabilizer. • Types – Relay type , Servo type, Tap changing & Phase control, Circuit diagram, Operating principle, Working, advantage, disadvantage, and applications. • Specifications. • Concept of Switch Mode Power Supply (SMPS). • Types of SMPS:- Isolated & Non Isolated • Isolated SMPS: Principle, operation, applications, advantages and disadvantages. • Non Isolated SMPS: Principle, operation, applications, advantages and disadvantages. 	08	20

<p>Topic 5: Uninterruptable Power supply Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Know Block diagram & functions of different stages in UPS ➤ Classify different UPS ➤ Specify different UPS ➤ List different applications of UPS <p>Contents:</p> <ul style="list-style-type: none"> • Need of UPS, Basic block diagram, operating Principle • Classification ON-line - UPS OFF-Line – UPS Line Interactive UPS Block diagram, Working principle, advantages, disadvantages • UPS Specifications Input Voltage Range, DC Voltage Range, Transient Response, Response Time, Total Harmonic Distortion, output frequency, output waveforms, Transient Recovery, load power factor and types of Protection circuit. • Battery parameters-back up time, power rating, transfer time. Types of protection circuits. 	06	12
<p>Topic 6 : Resistance Welding Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Draw Block diagram & state functions of each block of resistance welding system. <p>Contents :</p> <ul style="list-style-type: none"> • Principle of Resistance Welding • Types of Resistance Welding Spot , Projection , Butt , Seam & Pulsation type welding • AC Resistance Welding, Line contactor, synchronous weld control • Energy Storage Welding: Capacitor energy storage welding -Block diagram, Working, advantages, disadvantages. • Sequential resistance welding using sequence timer Labeled block diagram, function of each block and applications 	08	16
TOTAL	48	100

Practical:**Skills to be developed****Intellectual Skills:**

1. Select proper power device for specific application
2. Identify the faults and location.

Motor Skills:

1. Accuracy in measurement of different parameter
2. Testing

List of Practicals:

1. Verify the over voltage protection circuit using zener diode.
2. Observe and measure the output voltage and duty cycle for step-up chopper.
3. Observe and measure the output voltage and duty cycle for step-down chopper.
4. Observe and measure the output voltage and frequency for series inverter.
5. Observe and measure the output voltage and frequency for parallel Inverter.
6. Observe and measure the output voltage and frequency for single phase cycloconverter.
7. Measure the output voltage for servo type voltage stabilizer for different values of a c input voltage.
8. Measure the output voltage for relay type voltage stabilizer for different values of a c input voltage.
9. Measure different voltages at different test points and verify specifications with the datasheet of the manufacturer for UPS. (Input voltage, output voltage, output frequency, transient response, back up time)
10. Measure different voltages at different test points and verify specifications with the datasheet of the manufacturer for SMPS. (Input voltage, output voltage, output frequency)

Learning Resources:**Books:**

Sr. No	Title	Author	Publisher
1	Power Electronics and its Application	Alok Jain	Pennom International
2	Industrial & Power Electronics	G.K. Mittal	Khanna Publisher
3	Industrial Electronics & Control	Bhattacharya, S.Chatterjee	Tata McGraw Hill
4	Power Electronics	Singh	Tata McGraw Hill
5	Industrial Electronics (ATEST Lab Manual)	Zabar	Tata McGraw Hill
6	Power Electronics	Muhammad H. Rashid	PHI publication

Course Name : Diploma in Industrial Electronics
Course Code : IE / IU
Semester : Fifth for IE and Sixth for IU
Subject Title : Advanced Industrial Electronics
Subject Code : 17542

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:

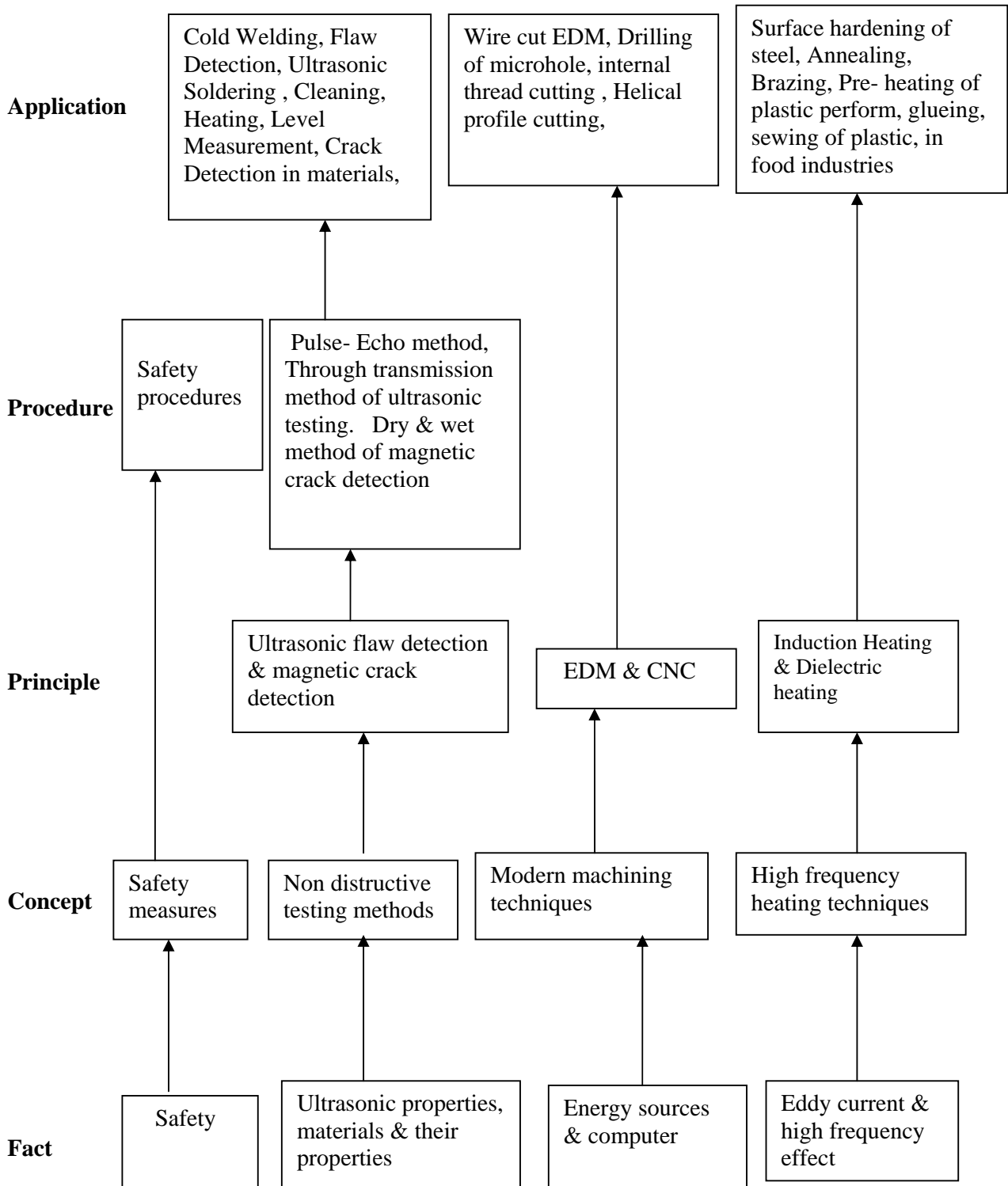
With advancement of technologies, Industries had undergone revolution. To cope up with the modern industries diploma engineers are to be exposed to the modern techniques .Advanced Industrial Electronics subject is classified under technology group. The subject enables the student to learn basic facts, concepts, principles, procedures and safety used in modern industries. Advanced Industrial Electronics explain the operation of NDT techniques and their applications. It highlights the concepts in modern machining techniques. This subject covers various testing techniques used for engineering materials.

Objectives:

The students will be able to -

- 1) Understand operation of modern machinery.
- 2) Learn Industrial safety procedures.
- 3) Understand non destructive testing of materials and applications of non- traditional machining in automation.

Learning Structure



Contents: Theory

Contents	Hrs.	Marks
<p>Topic 1: Concept of Modern Industry and Industrial Safety</p> <p>Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Know importance of modern industry ➤ know Industrial safety and precautions <p>Contents</p> <ul style="list-style-type: none"> • Concept and Information of modern industry • Problems in traditional industries • Advantages of modern industry over traditional industry • Industrial Safety <ul style="list-style-type: none"> Causes of accidents Types of accidents Accident prevention Safety procedure 	06	12
<p>Topic 2: Ultrasonic Testing</p> <p>Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Learn different NDTs ➤ Identify flaws in material ➤ Learn ultrasonic applications <p>Contents :</p> <ul style="list-style-type: none"> • Review of NDT • Different NDT methods: Liquid penetrant test, ultrasonic testing, magnetic particle testing, radiography, eddy current testing • Review of piezoelectric and magnetostriction effect for ultrasonic generation • Generation of Ultrasonic Mechanical methods, thermal methods, modern methods (Principle of operation only) • Transistorized magnetostriction oscillator circuit diagram, working, advantages and disadvantages • Ultrasonic flaw detection Pulse-echo method, through transmission method- block diagram, explanation, advantages and disadvantages. • Different types of probes& materials used in testing(quartz, ceramic, lithium sulphate) Construction of Normal angle and TR probe Couplants. • Applications of Ultrasonic: Cold welding, Ultrasonic cleaning, ultrasonic soldering, ultrasonic heating, Block diagram and explanation Thermo-acoustic and electronic-acoustic method Ultrasonic level measurement 	08	20

<p>Topic 3: Magnetic Crack Detection</p> <p>Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Identify the material and Magnetization technique ➤ Classify magnetization methods as per type of crack ➤ Use of dry and wet inspection media method <p>Contents:</p> <ul style="list-style-type: none"> • Principle of magnetic crack detection. • Materials used in magnetic crack detection ferromagnetic material, inspection media Ferromagnetic material powder (non- fluorescent, fluorescent). • Orientation of magnetic field Longitudinal magnetization (Principle using bar magnet) Coil shot method, yoke method, torroidal method. Circular magnetization Principle using circular magnet Headshot method, central conductor method and prod magnetization method. Localized magnetization using Torroid method, prod magnetization, horse- shoe magnet method. • Types and amount of magnetizing current used for magnetization • Types of inspection media dry and wet method (magnaflux and magnalo method) with advantages and disadvantages • Need of demagnetization, techniques used for demagnetization. • Techniques of recording results: Transparent plastic tape, strippable lacquer film 	<p>10</p>	<p>20</p>
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<p>Topic 4: Modern Manufacturing Machines</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Know non-traditional machining techniques ➤ Know electronic concepts in EDM and CNC machine. <p>Contents</p> <ul style="list-style-type: none"> • 1 Concept of non-traditional machining and mass Production techniques. • Introduction to thermal, electro-thermal, Chemical, electro-chemical, mechanical type NTM • Electro-thermal type NTM - EDM- Principle of EDM , Basic set up of EDM Subsystems used in EDM set up such as servomotor, high pressure pump, filter, pressure-gauge, dielectric fluid, dc supply and electrodes (tools). DC supply- DC relaxation oscillator and pulse generator. Materials used for electrode & properties of dielectric fluid. Basic block diagram of servomechanism. Advantages & disadvantages of EDM. Applications-drilling of microhole, wire cut EDM, internal thread cutting, helical profile cutting(diagram & explanation) • Introduction to NC, CNC , DNC, CIM system Block diagram & explanation of NC,CNC,DNC,CIM Input media used in NC Classification of CNC machines Open loop and closed loop Absolute and incremental system Analog and digital system Straight-line, contouring path system. Position and velocity feedback used in closed loop system. Basic principles of manual part programming Use of G code and M code used in part programming Concept of computer aided part programming, advantages of computer aided part programming 	08	16
	08	14

<p>Topic 5: RF Heating</p> <p>Specific Objectives :</p> <ul style="list-style-type: none"> ➤ Realize high frequency heating ➤ Know different heating techniques ➤ Know different applications of induction and dielectric heating <p>Contents:</p> <ul style="list-style-type: none"> • High frequency heating • Concept of different heating techniques- Induction heating, Dielectric heating, IR heating, Microwave heating. • Introduction to induction heating- Principle of induction heating, basic set-up of induction heating. • Block diagram and explanation of induction heating. • Oscillator circuit used in induction heating system circuit diagram, working, frequency range. • Application of induction heating-Surface hardening of steel, Annealing, brazing and other applications. (Block diagrams and explanation) • Advantages and disadvantages of induction heating. • Introduction to dielectric heating-Principle of dielectric heating, Block diagram and explanation of dielectric heating, dielectric losses, electrode connection to tank circuit. • Applications of dielectric heating-Preheating of plastic perform, wood Gluing, Sewing of plastic, In food industries, In medical industries • Advantages and disadvantages of dielectric heating. • Comparison of dielectric and induction heating. 	08	18
Total	48	100

Practical:**Skills to be developed****Intellectual Skills:**

1. Select proper NDT method
2. Operation of Machinery.

Motor Skills:

1. Identify size and location of fault in materials.
2. Use of modern machinery in automation.

List of Practicals:

- 1) Find the flaws in the given material using pulse echo method for ultrasonic flaw detection.
- 2) Measurement of liquid level using ultrasonic technique.
- 3) Demonstration of different industrial techniques used in Magnetic crack detection for surface and sub surface crack detection

- 4) Demonstration of EDM process.
- 5) Demonstration of wire cut EDM.
- 6) Demonstration of NC/CNC machines.
- 7) Measure the rise in temperature of conducting material using Induction heating system.
- 8) Measure the rise in temperature of dielectric material using Dielectric heating system.
- 9) Report on automation industry visit.

Learning Resources:**Books**

Sr. No	Title	Author	Publisher
1	B.S. Pabla , M.Adithan	CNC Machines	New Age International Pvt. Ltd.
2	Baldev Raj, T. Jaykumar M. Thavasimutha	Practical Non-destructive Testing	Narosa Publishing House
3	S. K. Bhattacharya, S. Chatterjee	Industrial Electronics & Control	Tata McHill Publishing Co.
4	G. K. Mittal	Industrial & Power Electronics	Khanna Publication
5	HMT	Production Technology	Tata McHill Publishing Co.
6	T.R. Banga, S.C. Sharma	Industrial Organization & Engg. Economics	Khanna Publication

Course Name : Diploma in Electronics and Video Engineering

Course Code : EV

Semester : Fifth

Subject Title : TV Receiver

Subject Code : 17547

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:

Television Receivers subject mainly concerns with continuously changing technology for different types of television receivers are available in market like CRT, LCD, PLASMA and LED. Depending on the technology the resolution of the reception varies.

The topic Colour TV receiver deals from basics of Colour TV receivers to all the new development in television engineering. Students will learn and gain knowledge about the working of different sections (tuner, audio and video amplifier, luminance and chrominance signal flow and picture display methods) of TV Receivers. Students get involved practically to diagnose faults and rectify them in Television Receiver, for different stages of Colour TV receiver (PAL System).

The topics Displays deal with different types of TV receiver display methods and role of microcontroller in Television system.

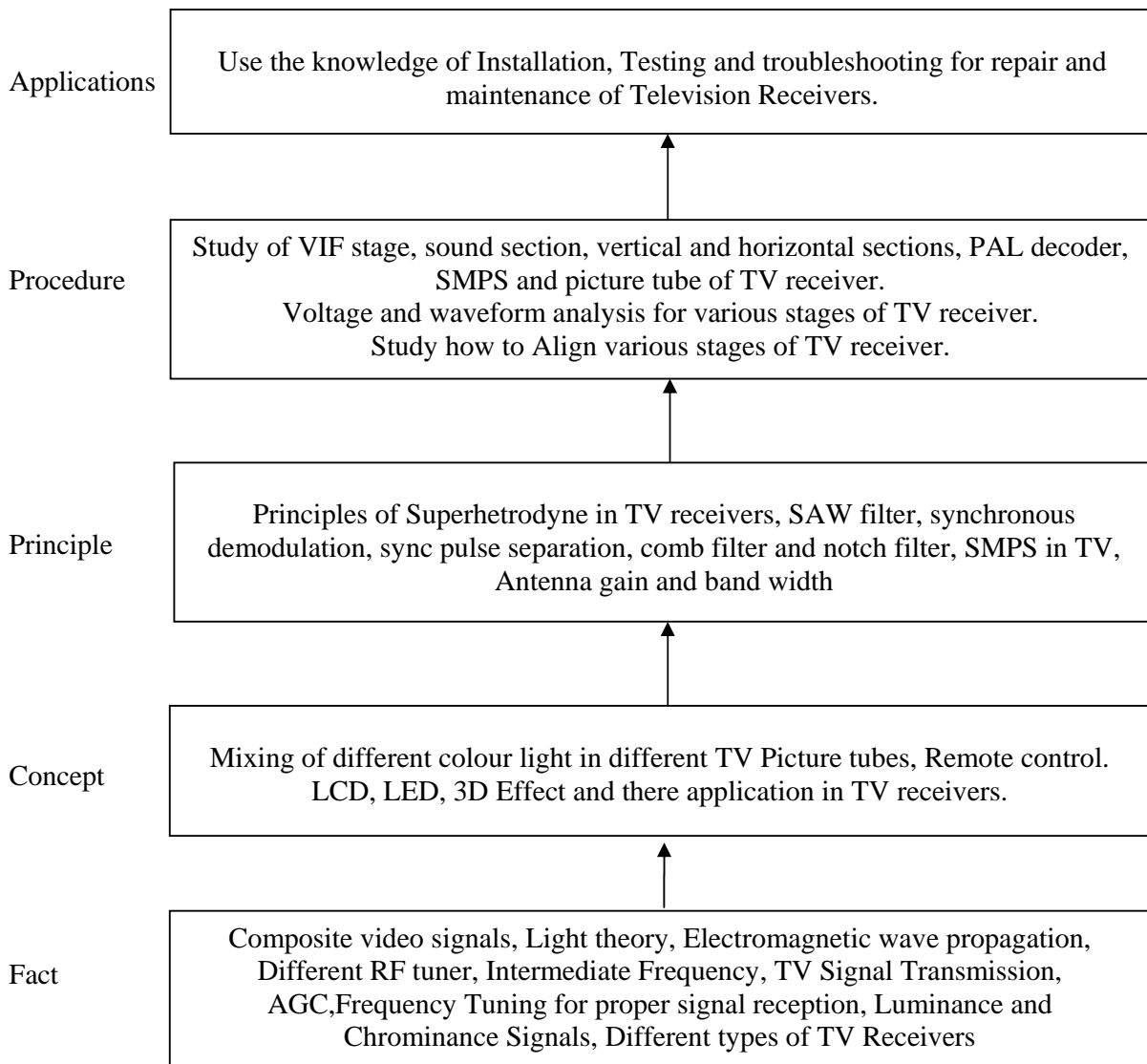
To understand these subject students should know the Basic of Electronics, basic communication systems and transmission of Television signals.

Thus subject matter will make the student fully contented with the knowledge of TV receiver repairs and maintenance.

General Objectives.

Students will be able to:

1. Understand the process of receiving and reproducing sound and picture in colour television receiver.
2. Understand the concept of troubleshooting at different stages of TV receiver.
3. Align IF section of TV receiver.
4. Diagnose and rectify faults of the common types cropped in every stage of a colour television set.

Learning Structure:

Topic and Contents	Hours	Marks
<p>Topic 1] Colour TV Receiver</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Understand requirements for Colour TV. ➤ Describe how sound and picture are received using typical block diagram of a receiver sets. <p>Contents:</p> <ul style="list-style-type: none"> • Block Diagram of Colour TV receiver and function of each block. • Hyper Band tuner: Block diagram and working only with varicap tuning, Band switching, frequency synthesizer tuning. • SAW filter: Construction of SAW filter, function, advantages and disadvantages. • VIF stage: Block diagram and response curves for CTV and function of each block. • Schematic diagram of VIF IC: CA7611/ CA 7607 and its working. • Need of AGC and AFT: Requirement of AGC in TV, Block schematic of AFT • Generation of sound IF: Schematic diagram of Sound section IC 1190, its function. 	10	24
<p>Topic 2] Luminance and Chrominance Processing</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Explain the working principles of a colour decoder: ➤ State function of Chrominance and Burst gate amplifiers ➤ Explain working of Phase detector, Colour killer <ul style="list-style-type: none"> • Circuit diagram of Luminance signal processing: Circuit diagram of Luminance signal processing and explain its working. • Block Diagram of PAL decoder: Block diagram of PAL Decoder and Function of each block. • Adder and Subtractor circuit: Use of Adder and Subtractor circuits to generate U and V signals • Chroma delay line: Requirement, Construction and working. • ACC Amplifier circuit, Ident and Colour Killer circuit :Circuit diagram of ACC amplifier, it's working. Diagrams of Ident and colour killer circuits and their function • Need of Reference Oscillator and its circuit: Circuit of reference oscillator and its working, its need in TV receiver. 	12	24

<p>Topic 3] Sweep Section Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Explain separation of horizontal and vertical sync pulses ➤ Explain amplification method of H and V sync pulses ➤ Use of AGC. ➤ Need of power supply for TV <p>3.1 Sync separator circuit [14 Marks]</p> <ul style="list-style-type: none"> • Circuit of Sync separator, its working with the help of block diagram. • Vertical-Output amplifier circuit and its working. • Horizontal-Output amplifier circuit and its working. • Block diagram of sweep section • Block diagram of Sweep Section and function of each block. • Schematic Diagram of IC7609 and its function. <p>3.2 Power supply section. [08 Marks]</p> <ul style="list-style-type: none"> • EHT Generation Diode split Technique • Schematic diagram of EHT generation and its working • SMPS • Block Diagram, Circuit of forward and reverse type SMPS and their merits and demerits. • Push-Pull SMPS block diagram explanation. 	10	20
<p>Topic 4] Micro Controller Based TV Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Understand advance TV systems. ➤ Understand characteristics and requirement of remote control system in TV. <p>Contents:</p> <ul style="list-style-type: none"> • Role of microcontroller in TV: Use of Microcontroller in TV Receiver. • Block diagram of microcontroller based TV: Block diagram of microcontroller based TV and its working. • Remote control System: Purpose of remote control system in TV. Its advantages and disadvantages, Draw the block diagram of Remote Transmitter and Receiver and its functions. 	06	12
<p>Topic 5] TV Display Methods Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Explain CRT display methods ➤ Explain working of LCD and LED TV. ➤ Explain working principle of projection TV. <p>Contents:</p> <ul style="list-style-type: none"> • Trinitron Picture Tube: Working of Trinitron picture tube with diagram, characteristics of Trinitron picture tube. • Plasma TV: Formation of picture pixels, characteristics, features of Plasma TV, controls available in Plasma TV. • LCD and LED TV: Orientation of liquid crystals to form matrix of picture pixels, Methods of charging. • Three dimensional (3D) TV : Concept of 3D TV, The techniques developed to create a 3D effect, Stereoscopic effect with the aid of special glasses, Auto stereoscope 	10	20
Total	48	100

Practical:**Intellectual skills:**

1. Select measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
2. Record and analyze the observations.
3. Interpret the results from observations and calculations.

Motor skills:

1. Proper handling of instruments.
2. Measuring voltages and current at different stages accurately.
3. Observe the phenomenon and to list the observations in proper tabular form.
4. Follow proper procedure while performing the experiment.

List of Experiments:

(For class size 60, batch size 20 experiments shall be conducted in cyclic order with group of 4 to 5 students)

1. To identify different sections and draw layout of IC based color TV receiver.
2. Testing of special components used in TV Receivers.
 - a. SAW filter.
 - b. EHT transformer
 - c. Yoke
 - d. Y –delay line
 - e. Chroma delay line
 - f. Convergence magnet.
 - g. Degaussing coil. *PTC
 - h. Tuner programming circuit
 - i. CRT base
 - j. Hyper tuner.
3. To observe the symptom, do logical analysis and rectify fault in Tuner and VIF stage.

Symptoms–Snowy Raster

 - a. Excessive Snow
 - b. No Raster
 - c. Only one or two bands (VL/VH/U) are in Working.
 - d. Plain Raster
4. Alignment of SIF and VIF.
5. To observe the symptom, do logical analysis and rectify fault in Chroma stage.

Symptoms – a) Wrong Colour b) Excessive Tint c) No Colour Variation d) No Colour
6. To observe the symptom, do logical analysis and rectify fault in Luminance and picture tube.

Symptoms - Only colour present Luminance absent.

- Excessive colour (R or G or B) with reference line.
7. To observe the symptom, do logical analysis and rectify fault in Luminance and picture tube.

Symptoms-- Any primary colour missing.

- weak luminance/defocus picture (picture tube screen/focus control circuit)

8. To observe the symptom, do logical analysis and rectify fault in Sweep section.
Symptoms-- No raster (H-Drive)
H - line (fault no. 1)
V - line
V- Blanking visible.
9. Installation of pattern generator for different patterns in TV receiver. Understand the Significance of each pattern
10. To observe the symptom, do logical analysis and rectify fault in microcontroller based TV
Symptoms - TV remains in stand by mode. - Relay, Relay driver faulty.
11. To observe the symptom, do logical analysis and rectify fault in microcontroller based TV
Trouble shooting in Remote Control Circuit.
Inoperative Remote Control TX / RX/ IR faulty.
12. White balance adjustment using remote control and remote operation.

Learning Resources:**1. Books:**

Sr. No.	Title	Author	Publisher
1	Colour Television Principles and Practice	R.R.Gulati	New Age International (P) Limited
2	Morden Television Practice	R.R.Gulati	New Age International (P) Limited
3	Television Engineering	Arvind Dhake	Tata Mc Graw Hill
4	Basic TV and Video System	Barnard Grobe	Tata Mc Graw Hill
5	Colour Television theory & practice	S.P.Bali	--
6	Television Engineering and Video System	R.G.Gupta	Tata Mc Graw Hill

2. Websites:

http://en.wikipedia.org/wiki/High-definition_Disc_player
http://en.wikipedia.org/wiki/Plasma_display
<http://en.wikipedia.org/wiki/Backlit>