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.

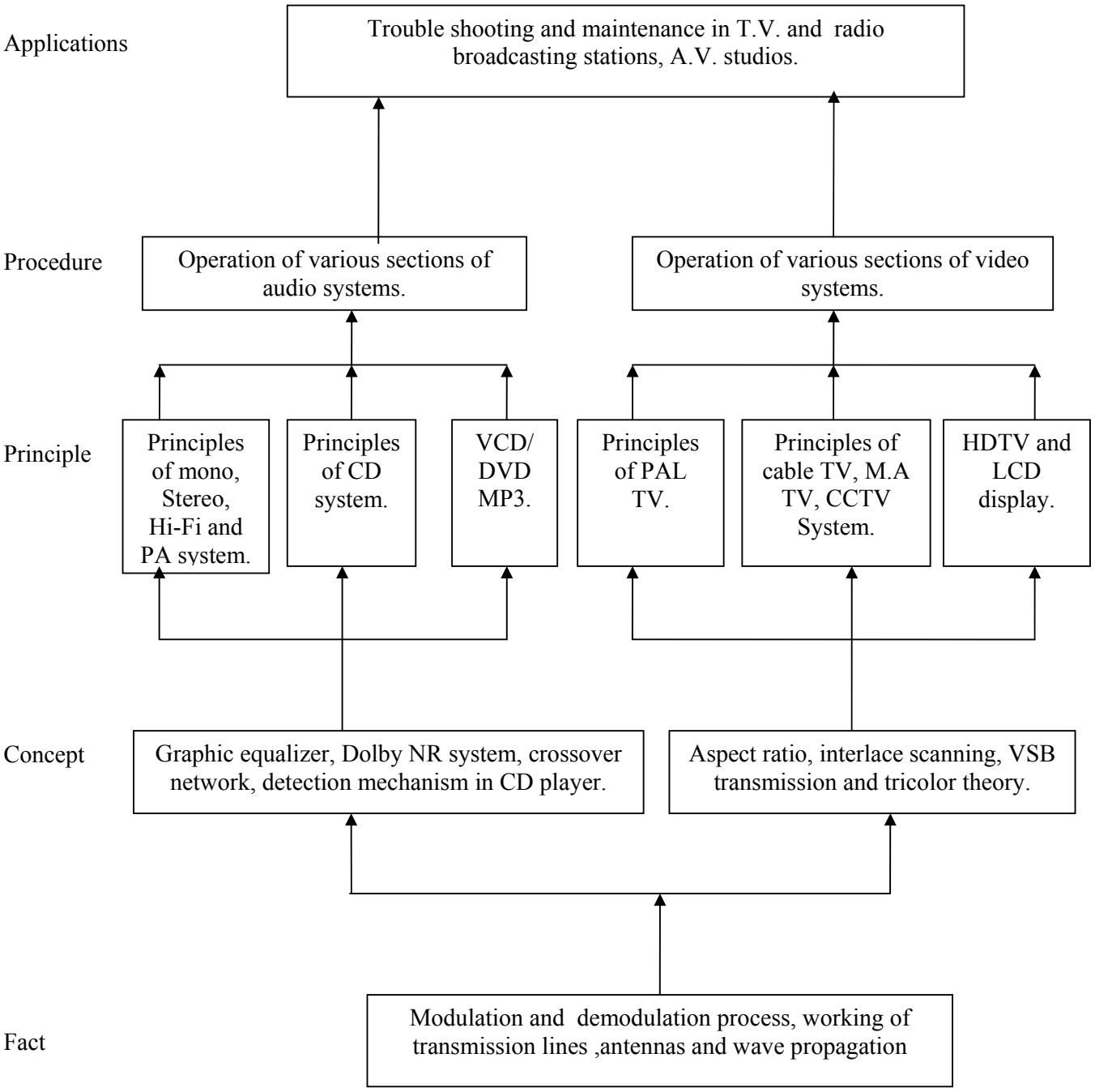
The topic on cable TV explains how the TV signals are collected from different sources, mainly satellite and on due processing distributed from cable station to subscribers over the cable network.

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:



Contents: Theory

Topic and Contents	Hours	Marks
Topic 1] Hi Fi Audio Amplifier **Specific Objectives:** **Students will be able to** ➢ Distinguish between different types of Audio amplifiers ➢ Explain the principle and operation of Graphic equalizer ➢ Draw labeled sketch of Hi-Fi amplifier ➢ Define pre-emphasis and de-emphasis **Contents:** • Introduction to Amplifiers: Mono, Stereo, Public Address. Difference between stereo amplifier and Mono amplifier. • Block diagram of Hi Fi amplifier and its working. Controls available on it and their function, Graphic equalizer concept- circuit diagram and operation. (5-Point Circuit diagram) • Dolby NR recording system • Types of speaker –woofer, Mid-range, Tweeter • Cross over network circuit and its function	07	12
Topic 2] CD player **Specific Objectives:** ➢ Describe the principle of detection mechanism of CD player ➢ List the components used in CD mechanism **Contents:** • CD – Material used, Size and Capacity. • Block diagram and operation of CD player. • Component used for CD mechanism: CD pick-up assembly, gear system, drive motors, CD lens. Function of front panel controls. • Function of remote control transmitter and receiver unit used in CD player. • Advantageous of Vacuum florescent.	05	12
Topic 3] TV Fundamentals **Specific Objectives:** ➢ Define various terms used in TV system ➢ Draw and label composite video signal wave-forms ➢ State CCIR-B standards for TV system **3.1 [04 Marks]** • Concept: Aspect ratio, image continuity, interlace scanning, scanning periods – horizontal and vertical, vertical resolution, horizontal resolution. • Vestigial sideband transmission, bandwidth for Colour signal, brightness, contrast, viewing distance, luminance, Hue, saturation, compatibility. **3.2 [08 Marks]** • Colour theory, primary colours and secondary colours Grassman's law, additive Colour mixing subtractive Colour mixing. **3.3 [08 Marks]** • Composite Video Signal - Pedestal height, Blanking pulse, Colour burst, Horizontal sync pulse details, Vertical sync pulse details, Equalizing pulses, CCIR B standards for Colour signal transmission & reception. • TV channel allocation for band I & band III.	09	20

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

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

Practicals:
To develop following skills:

Intellectual Skills:

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

Motor Skills:

1. Draw and illustrate different sections of audio and video systems.
2. Test different sections of audio and video systems.
3. Measure various parameters of audio and video systems.
4. Install DTH system.

List of Practicals:

1. Trace out put stage of Hi –Fi amplifier & Draw the component layout of it.
2. Locate Fault by voltage analysis method in a Hi Fi Audio amplifier (Any three different faults)
3. Plot frequency response of Graphic equalizer
4. Identify various control of front panel of CD player & Draw the drive mechanism layout of CD player
5. Trace: a) Chroma Section, b) Picture Tube of colour TV receiver.
6. Trace: a) Horizontal section b) Vertical section of colour TV receiver.
7. Voltage analysis of colour TV receiver
   a) Chroma section, b) Picture Tube
8. Voltage analysis of colour TV receiver
   a) Vertical Section b) horizontal section
9. Locate the Faults and rectify in given Colour TV
   a) No raster b) Red colour only

c) Blue colour only d) Green colour only
e) Magenta colour only f) Cyan colour only
g)Yellow colour only h) No sound

10. Locate the Faults and rectify in given Colour TV:
    a) Fault in HSYNC section. b) Fault in VSYNC section.
    c) Fault in SYNC separator. d) Fault in video amplifier.

11. Trace the circuit layout of LED television receiver.
12. Trace the circuit layout of LCD television receiver.

Assignments:

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

Learning Resources:

1) Books:

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

2) Websites:

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