

KADI SARVA VISHWAVIDYALAYA

B.E. Semester: VI
Electronics & Communication Engineering
Subject Name: Audio Video Systems
Subject Code : EC-605

W.E.F 2014-2015

A. Course Objective:

The educational objectives of this course are

- To present a problem oriented introductory knowledge of Audio Video Systems.
- To address the underlying concepts and methods behind Audio Video Systems.

B. Teaching / Examination Scheme :

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
EC-605	Audio Video Systems	3	0	2	5	4	3	70	30	20	30	150

C. Detailed Syllabus:

1. **Characteristic of Sound:**
Nature of Sound, pressure and Intensity of Sound Waves, Sensitivity of Human-Ear for Sound, Loudness and Phon, Frequency of Sound Waves, Intervals, Octaves and Harmonics, Pitch, resonance effect in sound systems.
2. **Audio Devices and Applications:**
Microphone Sensitivity, Nature of Response and Directional Characteristics, Measurement Microphones, Various Types of Microphones, Various Types of Loudspeakers, Characteristic Impedance of Loud Speakers, PA Systems & Installations.
3. **Optical Recording:**
Types of Optical Recording of Sound, Methods of Optical Recording of Sound on film, Reproduction of Sound from Films, Compact Disc, Optical Recording on Disc, Playback Process, Comparison of Compact and Conventional Discs principle of disc recording, principle of Disc reproduction, block diagram of disc recording system, block diagram of disc reproduction system, production of disc records on mass scale, coarse-grooves and micro-grooves, construction of cutter stylus, playback needles, cartridges or pick-up units, Equalizations in disc recording/playback systems.
4. **Audio Amplifier :**
Types of Audio Amplifiers, Audio Amplifier VS RF amplifier, characteristics of Audio Amplifiers, voltage amplifier, power amplifier, push-pull power amplifier, complementary symmetry push-pull amplifier, negative feedback in amplifiers, controls in Audio amplifiers, special types of tone controls.

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5. **Introduction to Television & television pictures:**
Picture transmission, television transmitter, television receiver, synchronization, receiver controls, geometric form and Aspect ratio, image continuity, number of scanning lines, interlaced scanning, picture resolution, brightness gradation and colour characteristics.
6. **Television Cameras and picture tubes:**
Camera tube types, vidicon camera tube, silicon diode array vidicon, camera optics, monochrome TV camera, colour cameras, camera control equipment, monochrome picture tube, electrostatic focusing, beam deflection, picture tube screen, raster centering adjustments, picture tube characteristics and control, picture tube specifications, colour picture tubes.
7. **Composite video signal and colour signal-generation and encoding:**
Video signal dimensions, Horizontal sync composition, Vertical sync details, Function of vertical pulse train, Scanning sequence details, Perception of brightness and colour, Additive and subtractive colour mixing, Video signals for colours, Luminance signal (Y), Compatibility, Colour-difference signals, encoding of colour difference signals, Formation of chrominance signal, PAL Encoder.
8. **Television Signal Transmission & Propagation:**
Picture Signal transmission, Positive and negative modulation, Vestigial sideband transmission, Standard channel BW, Television transmitter, TV Signal propagation, Interference suffered by TV channels. TV broadcast channels for terrestrial transmission.
9. **Television Receiver:**
RF Tuner, IF Subsystem, Video amplifier, Sound section, Sync separation and processing, Deflection circuits, Scanning Currents in the yoke, DC Power supplies. Electronic tuners, IF Subsystem, Y Signal channel, Chroma decoder, Separation of U and V colour phasors, Synchronous demodulators, Sub carrier generation and control, Matrixing for drive Circuits.
10. **Advances in TV Technology:**
HDTV, Display Technologies (CRT, LCD, Plasma, LED, Projection), Video Interfaces (Composite, Component, S-Video, DV, HDMI, DVI).
11. **Television Systems and Standards:**
NTSC Colour System, PAL Colour System, French B&W and Colour TV System, Television Standard. Introduction to CCTV.

D. Lesson Planning:

Sr. No.	No. of Hours	% Weight-age in Exam	Topics
1.	3	3	Characteristic of Sound: Nature of Sound, pressure and Intensity of Sound Waves, Sensitivity of Human-Ear for Sound, Loudness and Phon, Frequency of Sound Waves, Intervals, Octaves and Harmonics, Pitch, resonance effect in sound systems.
2.	6	10	Audio Devices and Applications: Microphone Sensitivity, Nature of Response and Directional Characteristics, Measurement Microphones, Various Types of Microphones, Various Types of Loudspeakers,

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			Characteristic Impedance of Loud Speakers, PA Systems & Installations.
3.	6	10	Optical Recording: Types of Optical Recording of Sound, Methods of Optical Recording of Sound on film, Reproduction of Sound from Films, Compact Disc, Optical Recording on Disc, Playback Process, Comparison of Compact and Conventional Discs principle of disc recording, principle of Disc reproduction, block diagram of disc recording system, block diagram of disc reproduction system, production of disc records on mass scale, coarse-grooves and micro-grooves, construction of cutter stylus, playback needles, cartridges or pick-up units, Equalizations in disc recording/playback systems.
4.	4	7	Audio Amplifier : Types of Audio Amplifiers, Audio Amplifier vs RF amplifier, characteristics of Audio Amplifiers, voltage amplifier, power amplifier, push-pull power amplifier, complementary symmetry push-pull amplifier, negative feedback in amplifiers, controls in Audio amplifiers, special types of tone controls.
5.	3	10	Introduction to Television & television pictures: Picture transmission, television transmitter, television receiver, synchronization, receiver controls, geometric form and Aspect ratio, image continuity, number of scanning lines, interlaced scanning, picture resolution, brightness gradation and colour characteristics.
6.	4	10	Television Cameras and picture tubes: Camera tube types, vidicon camera tube, silicon diode array vidicon, camera optics, monochrome TV camera, colour cameras, camera control equipment, monochrome picture tube, electrostatic focusing, beam deflection, picture tube screen, raster centering adjustments, picture tube characteristics and control, picture tube specifications, colour picture tubes.
7.	4	10	Composite video signal and colour signal-generation and encoding: Video signal dimensions, Horizontal sync composition, Vertical sync details, Function of vertical pulse train, Scanning sequence details, Perception of brightness and colour, Additive and subtractive colour mixing, Video signals for colours, Luminance signal (Y), Compatibility, Colour-difference signals, encoding of colour difference signals, Formation of chrominance signal, PAL Encoder.
8.	3	8	Television Signal Transmission & Propagation: Picture Signal transmission, Positive and negative modulation, Vestigial sideband transmission, Standard channel BW, Television transmitter, TV Signal propagation, Interference suffered by TV channels. TV broadcast channels for terrestrial transmission.

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9.	5	15	Television Receiver: RF Tuner, IF Subsystem, Video amplifier, Sound section, Sync separation and processing, Deflection circuits, Scanning Currents in the yoke, DC power supplies. Electronic tuners, IF Subsystem, Y Signal channel, Chroma decoder, Separation of U and V colour phasors, Synchronous demodulators, Sub carrier generation and control, Matrixing for drive circuits.
10.	4	10	Advances in TV Technology: HDTV, Display Technologies (CRT, LCD, Plasma, LED, Projection), Video Interfaces (Composite, Component, S-Video, DV, HDMI, DVI).
11.	3	7	Television Systems and Standards: NTSC Colour System, PAL Colour System, French B&W and Colour TV System, Television Standard. Introduction to CCTV.
TOTAL	45	100	

E. Instructional Method & Pedagogy (ANNEXURE-I)

F. Suggested list of Experiments:

1. To study block diagram and circuit diagram of colour TV.
2. To study detailed circuit description of RF tuner, IF subsystem section and their functions.
3. To study detailed circuit description of video and chroma section and its function.
4. To study detailed circuit description of vertical oscillator.
5. To study detailed circuit description of horizontal oscillator.
6. To study detailed circuit description of sound section.
7. To study detailed circuit description of SMPS section.
8. To study of PA Systems and its components.
9. Study of Pattern Generator.
10. Frequency Response of microphones
11. Frequency Response of loudspeakers
12. Study of Audio Metering Tools like DB Meter.

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G. Students Learning Outcomes:

On successful completion of the course

- The student can identify different areas of Audio Video Systems. Can find the applications of all the areas in day to day life. Can identify the operations, working, construction, material etc. Aspects of Audio-Video Systems.

H. Recommended Study Materials:

Text Book:

1. Modern Television Practice by R.R. Gulati.
2. Audio Video Systems by R.G. Gupta, Technical Education.

References Books:

1. Audio Video Systems Principles Practices and Troubleshooting, by Bali & Bali, Khanna Publishing Company
2. Essential Guide to Digital Video by John Watkinson, Snell & Wilcox Inc Publication.

