Syllabus for B.Sc. EEM 5th and 6th Semester

Course Structure		
Semester	**Course**	**Course Code**
5th	Maintenance concepts , Instruments and Appliances I	EEM-3E
	Maintenance concepts , Instruments and Appliances I Lab	EEM-3E Lab
6th	Maintenance concepts , Instruments and Appliances II	EEM-3F
	Maintenance concepts , Instruments and Appliances II Lab	EEM-3F Lab

Semester-V

EEM-3E Maintenance Concepts, Instruments and Appliances I

Unit I

Electronic Equipment, Potential Problems, Quality, Terminology and definitions of : Reliability, Failure, Failure Rate, Mean Time between Failures (MTBF), Mean Time to Fail (MTF), Mean Time To Repair (MTR), Maintainability, Availability, Redundancy. **(15 Lectures)**

Unit II

Construction of DC and AC generator , Equation for Generator Emf , Working of Dynamo , Construction of DC generator , Concept of Rotor and Stator .Study of tachogenerators. **(15 Lectures)**

Unit III

Study of dc motor, construction and principle of operation, Study of motor windings, Introduction to transformers, autotransformer, dc to ac converter, chopper circuits. **(15 Lectures)**

Unit IV

Analog to digital converters, Schmitt Trigger, Instrumentation Amplifiers, 555 Timer, Monostable and Bistable Multivibrators, Sweep generator and Square wave generator **(15 Lectures)**

Recommended Books:

1. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting by R. G. Gupta Tata McGraw Hill Edition 2001.
2. Student Reference Manual for Electronic Instrumentation Laboratories by Stanley Wolf, and Richard F.M. Smith, Prentice Hall of India Pvt. Ltd. New Delhi.
3. Electronic Instrumentation and Measurement Techniques by WD Cooper, AD Helfrick, Prentice Hall of India Pvt. Ltd. New Delhi.
4. Digital Instrumentation A. J. Bouwens, Tata McGraw Hill.
5. Electrical Machines by Nagrath Kothari.

Semester-V

List of Practical's (EEM-3E Lab Maintenance Concepts, Instruments and Appliances I Lab)

Practical work includes the detail explanation of all the circuit components and blocks of the system are included. A full demonstration of all the systems is a must before proceeding with the hands on experimentation. Atleast 10 experiments from the following:

1. Experiments on Rheostat, Potentiometer and Switches, EM Relay, Transformer, Autotransformer (Dimmerstat), Fuses.
2. Study and inspect all the parts of DC and AC generator circuit.
3. Working of DC and AC generator.
4. Working operation of Dynamo.
5. Study and inspect all the different type of Motor Circuits (Induction, synchronous etc.)
6. Study the operation of Chopper circuit using proper waveforms
7. Design of a stable and monostable multivibrators using 555 Timer.
8. Working of Instrumentation Amplifiers
9. Study of transformer action.
10. Analyze the output waveform for a square wave and sawtooth wave generators.

Semester-VI

EEM-3F Maintenance Concepts, Instruments and Appliances II

Unit I

Audio Systems Construction, principle of working and typical applications of: AM and FM radio receiver, receiver ICs, receiver characteristics and alignment, Use of these Receiver principles in mobile phone, satellite receiver (dish TV receiver) etc. High fidelity music systems, Principles of recording and replay of audio CD and ACD player. Blu-Ray player, Remote controls for these units, MP3 player, process of downloading mp3 in it. Different audio file formats and their comparison. (**20 Lectures)**

Unit II

Video Systems Construction, principle of working and typical applications of: Principles of TV transmission, vestigial sideband transmission, standard TV channels in India.(Brief Review).Principles of scanning and synchronization, composite video signal, B/W TV receiver Block diagram. (Brief Review) Principles of color TV transmission and PAL-B color standard. Block diagram of color TV, B/W and color picture tubes. **(15 Lectures)**

Unit III

Purpose of changing over from analog to digital TV and its timeline, the new Digital TV standards, SDTV / HDTV, Set-top box for cable TV and for DTH Construction of LCD and plasma panels for TV application. Working of LCD and plasma displays. Block diagram of digital LCD and plasma TV. Video monitors-CRT and LCD. **(15 Lectures)**

Unit IV

Basic information of VCD and DVD. Block diagram of VCD player and DVD Player. Applications of TV, Typical Automotive infotainment system - block diagram Public address system and its components, Home Theater, Car entertainment system. **(10 Lectures)**

Recommended Books:

1. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting by R. G. Gupta Tata McGraw Hill Edition 2001
2. Modern Electronic Equipment: Troubleshooting, Repair and Maintenance by Khandpur, TMH 2006
3. Consumer Electronics by S P Bali, Pearson 2008.
4. Standard Handbook of Audio and Video Engineering by Jerry Whitaker and Blair Benson

Semester-VI

List of Practical's (EEM-3F Lab Maintenance Concepts, Instruments and Appliances II Lab)

Practical work includes the detail explanation of all the circuit components and blocks of the system are included. A full demonstration of all the systems is a must before proceeding with the hands on experimentation. Atleast 10 experiments from the following:

1. Experiments on AM/FM radio receiver and its alignment.
2. Experiments on Music system: Study of hi-fi amplifier {LM 380}, stereo system, graphic equalizer, speaker system
3. Experiments on Color TV receiver: Observation of waveforms and voltages at various test points.
4. Tracing and study of block diagram of LCD TV/ Plasma TV. Group B Setting up, preventive maintenance, minor repairs and fault identification.
5. Experiments on MP3 player: Study of block diagram and various controls, downloading of songs CD/DVD player: Identification of parts, study of various controls group parts.