

**Deccan Education Society's
FERGUSSON COLLEGE (AUTONOMOUS),
PUNE**

**Syllabus
for**

**S. Y. B. Sc. (Vocational - Electronic
Equipment Maintenance)**

[Pattern 2019]

(B.Sc. Semester-III and Semester-IV)

from Academic Year

2020-21

S.Y. B.Sc. (Vocational Electronic Equipment Maintenance): Vocational EEM

Particulars	Name of Paper	Paper code	Title of Paper	No. of Credits
S.Y. B.Sc. Semester- III	Paper - 1	EEM-2301	Electronic Instruments - Maintenance and troubleshooting	2
	Paper - 2	EEM -2302	Audio and Video systems	2
	Paper - 3	EEM -2303	EEM practical-III	2
S.Y. B.Sc. Semester- IV	Paper – 1	EEM -2401	Computer Hardware	2
	Paper – 2	EEM -2402	Consumer products	2
	Paper - 3	EEM -2403	EEM practical-IV	2

S.Y. B.Sc. (Vocational EEM) Semester III		
Title of the Course and Course Code	Electronic Instruments-Maintenance and Troubleshooting (EEM2301)	Number of Credits : 02
Course Outcomes (COs)		
On completion of the course, the students will be able to:		
CO1	Identify causes of failures components and devices in electronic systems	
CO2	Describe the causes of failure in Semiconductor Devices,	
CO3	Summarize the fault diagnosis procedure	
CO4	Explain the importance of preventive maintenance	
CO5	Demonstrate the fault diagnosis procedure for instruments	
CO6	Develop skill of troubleshooting analog and digital circuits	

Unit. No.	Title of Unit and Contents	No. of Lectures
I	Failures and Testing of Semiconductor Devices Types of semiconductor devices, Causes of failure in Semiconductor Devices, Types of failure, Test procedures for Diodes, special types of Diodes, Bipolar Junction Transistors, Field Effect Transistors, Thyristors , Operational Amplifiers, Fault diagnosis in op-amp circuits	6
II	Troubleshooting Digital Circuits Logic IC families, Packages in Digital ICs, IC identification, IC pin-outs, Handling ICs, Digital troubleshooting methods – typical faults, testing digital ICs with pulse generators Logic clip, Logic Probe, Logic Pulser, Logic Current Tracer, Logic Comparator Special consideration for fault diagnosis in digital circuits Handling precautions for ICs sensitive to static electricity Testing flip-flops, counters, registers, multiplexers and de-multiplexers, encoders and decoders; Tri-state logic	12
III	Troubleshooting - Case studies Power supply circuits- Types of Regulators, Power Supply Troubleshooting, SMPS, High Voltage DC Power supplies; Multimeters, signal generators, Oscilloscope – Fault Diagnosis chart, CRT replacement	12
IV	Preventive maintenance Indications for preventive maintenance actions, preventive maintenance of Electronic circuits, mechanical systems, General guideline for cleaning and lubricating.	6

Learning Resources:

1. Troubleshooting Electronic Equipment, R. S. Khandpur, Tata Mc Graw Hill Publishing Ltd (2007)
2. Electronic Instruments and systems: Principles, maintenance and troubleshooting, R. G. Gupta, Tata Mc Graw Hill Publishing Ltd (2004)

3. Student Reference Manual for Electronic Instrumentation Laboratories by Stanley Wolf, and Richard F.M. Smith, Prentice Hall of India Pvt. Ltd. New Delhi (2003)

Audio and Video Systems (EEM2302)		
Title of the Course and Course Code	Audio and Video Systems (EEM2302)	Number of Credits : 02
Course Outcomes (COs)		
On completion of the course, the students will be able to:		
CO1	Identify the characteristics of audio and video signals.	
CO2	Identify various blocks in audio and video systems	
CO3	Summarize audio and video standards	
CO4	Illustrate the maintenance and troubleshooting steps	
CO5	Write application areas of AV systems	
CO6	Explain the grounding and shielding techniques	

Unit. No.	Title of Unit and Contents	No. of Lectures
I	<p>Audio System</p> <p>Block diagram of Audio systems, Sound characteristics, microphones and loud speakers – Characteristics, Types and comparison, Multi-way speaker system;</p> <p>Principles of recording and replay of audio CD/VCD/DVD/ Blu-Ray disc; Audio compression and its use, MP3/MP4 player, Different audio/Video file formats and their comparison, Audio amplifiers, HiFi and Dolby systems;</p> <p>Public address System- installation planning for public gathering, auditorium, stadium etc., Specification and selection of Audio systems</p> <p>AM and FM radio receiver, world band receiver, receiver characteristics and alignment;</p>	16
II	<p>Video Systems</p> <p>TV fundamentals- standard and types: analog, digital, HDTV, 4K, Purpose of changing over from analog to digital TV and its timeline, Digital TV standards, SDTV / HDTV, Set-top box for cable TV and for DTH; Construction and working of LCD, plasma, LED TV and flat panel displays . Block diagram of digital LCD and plasma TV. Video monitors- CRT and LCD/LED;</p> <p>Block diagram of VCD player and DVD/BD player; Applications of TV: CCTV and CATV, Other application areas for TV such as education, underwater and in nuclear installations, Smart or web enabled TV.</p>	16

III	Preventive Maintenance and Troubleshooting Precautions while using microphone and loudspeakers, maintenance policy, fault diagnosis, fault location, procedure for servicing and maintenance, shielding and grounding, Troubleshooting procedure.	4
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Learning Resources:

1. Audio and Video System, second edition, R. G. Gupta, Mc Graw Hill publication (2010)
2. Consumer Electronics: S P Bali, Pearson education (2008)

Title of the Course and Course Code	EEM Practical – III (EEM2303)	Number of Credits : 02
Course Outcomes (COs)		
On completion of the course, the students will be able to:		
CO1	Identify technical specifications of Electronic systems.	
CO2	Articulate skills of referencing from data-books, operating instruction manuals and other referencing material.	
CO3	Organize circuit drawings and block diagrams for a given instrument / equipment.	
CO4	Demonstrate handling of tools and instruments used for audio/video system testing and fault findings	
CO5	Standardize method to prepare technical report writing for laboratory exercises.	
CO6	Prepare block diagram for Electronic Audio/Video systems.	

List of experiments

Sr. No.	Group-A: Electronic Instruments
	(Identification of parts, preparing schematics and troubleshooting tips)
1.	Analog meters
2.	Digital meters
3.	Power supply
4.	Signal generator
5.	CRO
6.	Analog circuits
7.	Digital circuits
	Group-B: Audio and Video systems
	(Identification of parts, preparing schematics and troubleshooting tips)
8.	Multi-way speaker system
9.	PA system and its components
10.	PA system – requirement specs, installation planning
11.	Radio receiver
12.	Audio/ Video player system
13.	TV system
14.	Home theatre system

S.Y. B.Sc. (Vocational EEM) Semester IV		
Title of the Course and Course Code	Computer Hardware (EEM2401)	Number of Credits : 02
Course Outcomes (COs)		
On completion of the course, the students will be able to:		
CO1	Identify types of hardware elements of computer.	
CO2	Define various Input output devices used for computers	
CO3	Discuss variety of storages devices	
CO4	Compare the features of CPUs used in computer evolution.	
CO5	Illustrate the steps of preventive maintenance and troubleshooting for computer systems.	
CO6	Explain formatting and utility tools for drivers.	

Unit. No.	Title of Unit and Contents	No. of Lectures
I	An Overview of System and Components: CPU Cabinet: Power supply, SMPS, Motherboard, CPU, Cables and connectors, Main and auxiliary memory, Front and rear panel study. CPU: Microprocessor as CPU, General block diagram of CPU, CPU bus system, Packing, Cooling, Sockets and slots, Comparative study of Microprocessor's features with evolutions,	12
II	Input and Output Devices: wired /wireless Keyboard, Mouse, Joystick, Scanner, Digitizers, Light pen, Touch screen, Barcode Scanner Camcorder. Output devices: Monitor (CRT, LCD/ LED Panel,) Printer: Dot Matrix, Inkjet, LASER, Thermal, Plotter, Barcode Printers, Sound devices (Speaker, Headphone, Bluetooth, dongle)	8
III	Storage devices: Types and characteristics, Classification, Semiconductor, Magnetic, Optical ROM and its types. RAM and its types: SDRAM, EDORAM, DDR Series, Flash RAM. Memory modules, SIMM and DIMMs. Secondary Memory: Hard Disc Drive, Floppy Disc, CDROM, CD R/W, DVD, Pen Drive, flash memories: Mini/micro SD Card. Formatting and Utility Tools for drivers.	10
IV	Preventive maintenance and troubleshooting Motherboard, I/O devices, storage devices and power supply.	6

Learning Resources:

1. Upgrading and Repairing of PCs, Scott Muller, Que (2014)
2. IBM PC and Clones: Hardware, troubleshooting and maintenance, B. Govindarajalu, Tata Mac Graw Hill (2008)
3. Computer Motherboard Testing and Fault finding, S. K. Gupta
4. A+ guide to PC hardware maintenance and repair, Michael Graves, Thompson (2015)
5. Computer Hardware: Barry Blundell, Thompson (2008)

6. www.howstuffworks.com

S.Y. B.Sc. (Vocational EEM) Semester IV		
Title of the Course and Course Code	Consumer products (EEM2402)	Number of Credits : 02
Course Outcomes (COs)		
On completion of the course, the students will be able to:		
CO1	List and identify various Electronic gadgets.	
CO2	Classify different types of electronic consumer products.	
CO3	Discuss the technical specifications of telephone systems, electronic gadget and home appliances.	
CO4	Illustrate the steps of preventive maintenance and troubleshooting for consumer products.	
CO5	Summarize the working principles of consumer products	
CO6	Draw the block diagram of consumer products	

Unit No.	Title of Unit and Contents	No. of Lectures
I	Telephone systems Construction, working principle and specifications– landline phones, cordless phone, CDMA/GSM smart phone.	10
II	Electronic gadgets Construction, working principle and specifications of: Calculators, digital clock, POS terminal, GPS navigator, car infotainment and navigation system Fax, EPABX, photocopier, multifunction printer and EPABX, slide projector and overhead projector, Multimedia /Data projector, LCD and DLP projectors, large screen and rolling display.	20
III	Home appliances Construction, working principle and specifications of Microwave oven, Washing machine and Air conditioners.	6

Learning Resources:

1. Consumer Electronics by S P Bali, Pearson 2008

S.Y. B.Sc. (Vocational EEM) Semester IV		
Title of the Course and Course Code	EEM Practical – IV (EEM2403)	Number of Credits : 02
Course Outcomes (COs)		
On completion of the course, the students will be able to:		
CO1	Identify technical specifications of computer hardware and consumer products	
CO2	Articulate skills of referencing from data-books, user manual, operating instruction manuals and other referencing material.	
CO3	Demonstrate skill of preparing block diagram for electronic systems	
CO4	Identify the parts of various home appliances, electronic gadgets.	
CO5	Prepare circuit drawings and block diagrams for a given system.	
CO6	Prepare technical report writing skills for laboratory exercises.	

List of experiments

Sr. No.	Group - A
	(Identification of parts, preparing schematics and troubleshooting tips)
1.	Desktop PC –Hardware
2.	PC troubleshooting
3.	HD/CD/DVD drives
4.	Ink Jet/ Laser Printer
5.	SMPS
6.	UPS
	Group-B
	(Identification of parts, preparing schematics and troubleshooting tips)
7.	Telephone – landline/cordless
8.	Calculator
9.	Digital clock
10.	Projectors
11.	Microwave oven
12.	Washing machine/AC