

**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 |
|-------------------------------------|---------------|------------|---|----------------|
| <b>S.Y. B.Sc.<br/>Semester- III</b> | Paper - 1     | EEM-2301   | Electronic Instruments -<br>Maintenance and troubleshooting | 2              |
|                                     | Paper - 2     | EEM -2302  | Audio and Video systems                                     | 2              |
|                                     | Paper - 3     | EEM -2303  | EEM practical-III   | 2              |
| <b>S.Y. B.Sc.<br/>Semester- IV</b>  | 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. Semester III****EEM 2301: Electronic Instruments - Maintenance and troubleshooting****[Credits -2]****COURSE OUTCOMES:**

The learner

|      |  |
|------|--|
| CO-1 | Explores causes of failures components and devices in electronic systems |
| CO-2 | Acquires skill of troubleshooting analog and digital circuits            |
| CO-3 | Gets acquainted with fault diagnosis procedure                           |
| CO-4 | Understands the importance of preventive maintenance                     |

|          |   |           |
|----------|---|-----------|
| Unit -I  | <b>Failures and Testing of Semiconductor Devices</b><br>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  | <b>6</b>  |
| Unit -II | <b>Troubleshooting Digital Circuits</b><br>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 | <b>12</b> |
| Unit-III | <b>Troubleshooting - Case studies</b><br>Power supply circuits- Types of Regulators, Power Supply Troubleshooting, SMPS, High Voltage DC Power supplies; Multimeters, signal generators, Oscilloscope – Fault Diagnosis chart, CRT replacement  | <b>12</b> |
| Unit-IV  | <b>Preventive maintenance</b><br>Indications for preventive maintenance actions, preventive maintenance of Electronic circuits, mechanical systems, General guideline for cleaning and lubricating.   | <b>6</b>  |

**Books:**

|    |   |
|----|---|
| 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) |

**S.Y. B.Sc. Semester III**  
**EEM 2302: Audio and Video System**

[Credits -2]

**COURSE OUTCOMES:**

- The learner
- CO-1 Lists the characteristics of audio and video signals.  
CO-2 Identifies various blocks in audio and video systems  
CO-3 Learns audio and video standards  
CO-4 Understands maintenance and troubleshooting steps

|           |  |           |
|-----------|--|-----------|
| Unit -I   | <p><b>Audio System</b></p> <p>Block diagram of Audio systems, Sound characteristics, microphones and loud speakers – Characteristics, Types and comparison, Multi-way speaker system;<br/>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;<br/>Public address System- installation planning for public gathering, auditorium, stadium etc., Specification and selection of Audio systems<br/>AM and FM radio receiver, world band receiver, receiver characteristics and alignment;</p> | <b>16</b> |
| Unit -II  | <p><b>Video Systems</b></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;<br/>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>  | <b>16</b> |
| Unit -III | <p><b>Preventive Maintenance and Troubleshooting</b></p> <p>Precautions while using microphone and loudspeakers, maintenance policy, fault diagnosis, fault location, procedure for servicing and maintenance, shielding and grounding, Troubleshooting procedure.</p>   | <b>4</b>  |

**References**

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

## S.Y. B.Sc. Semester III

### EEM -2303: EEM Practical -III

#### COURSE OUTCOMES

The learner

- CO-1 Acquires skills of identifying technical specifications of Electronic systems
- CO-2 Demonstrates skill of preparing block diagram for Electronic systems
- CO-3 Learns skills of referencing from data-books, operating instruction manuals and other referencing material.
- CO-4 Prepares circuit drawings and block diagrams for a given instrument / equipment
- CO-5 Acquires ability to prepare technical report writing skills for laboratory exercises.

#### List of experiments

|     |  |
|-----|--|
|     | <b>Group-A: Electronic Instruments</b>                                   |
|     | (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   |
|     | <b>Group-B: Audio and Video systems</b>                                  |
|     | (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. Semester IV**  
**EEM 2401: Computer Hardware**

[Credits -2]

**COURSE OUTCOMES:**

The learner

- CO-1 Summarises types of hardware elements of computer  
 CO-2 Defines various Input output devices used for computers  
 CO-3 Lists variety of storages devices  
 CO-4 Identifies maintenance and troubleshooting steps

|           |  |           |
|-----------|--|-----------|
| Unit -I   | <b>An Overview of System and Components:</b> 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,                 | <b>12</b> |
| Unit -II  | <b>Input and Output Devices:</b> 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)  | <b>8</b>  |
| Unit -III | <b>Storage devices:</b> 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. | <b>10</b> |
| Unit-IV   | <b>Preventive maintenance and troubleshooting</b><br><br>Motherboard, I/O devices, storage devices and power supply.   | <b>6</b>  |

**References**

|    |   |
|----|---|
| 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. Semester IV**  
**EEM -2402: Consumer Products**

[Credits -2]

**COURSE OUTCOMES**

The learner

- CO-1 Acquires knowledge of Electronic gadgets  
 CO-2 Surveys various electronic consumer products  
 CO-3 Learns to generate technical specification sheet

|          |   |    |
|----------|---|----|
| Unit -I  | <b>Telephone systems</b><br>Construction, working principle and specifications- landline phones, cordless phone, CDMA/GSM smart phone.  | 10 |
| Unit -II | <b>Electronic gadgets</b><br>Construction, working principle and specifications of : Calculators, digital clock, POS terminal, GPS navigator, car infotainment and navigation system<br>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 |
| Unit-III | <b>Home appliances</b><br>Construction, working principle and specifications of Microwave oven, Washing machine and Air conditioners.   | 6  |

**Books:**

1. Consumer Electronics by S P Bali, Pearson 2008

## S.Y. B.Sc. Semester IV

### EEM -2403: EEM Practical -IV

#### COURSE OUTCOMES

The learner

- CO-1 Acquires skills of identifying technical specifications of computer hardware and consumer products
- CO-2 Demonstrates skill of preparing block diagram for Electronic systems
- CO-3 Learns skills of referencing from data-books, operating instruction manuals and other referencing material.
- CO-4 Prepares circuit drawings and block diagrams for a given system
- CO-5 Acquires ability to prepare technical report writing skills for laboratory exercises.

#### List of experiments

|     |  |
|-----|--|
|     | <b>Group - A</b>   |
|     | (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  |
|     | <b>Group-B</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   |