University of Pune

Three Year B. Sc. Degree Course in Electronic Science

Subject: Electronic Equipment Maintenance (Vocational)

1) Title of the Course:

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

(To be implemented from Academic Year 2014-15)

(A Vocational Subject under the UGC Scheme of Vocationalization at First Degree Level)

2) Preamble:

The systematic and planned curricula of this vocational subject from first year to the third year are aimed at focusing attention to the skills required for practicing the subject of Electronic Science, particularly troubleshooting and maintenance. This is expected to make the student become more confident in working and shall motivate and encourage the student for pursuing higher studies in Electronics and for becoming self-employed.

3) Introduction:

At **first year of under-graduation** the basic topics related to the Electronic equipment, maintenance concepts, electronic system building blocks, components, assembly techniques are dealt with. The practical course is designed to emphasize practical skills required for circuit building, testing and trouble-shooting.
At **second year under-graduation**: The level of the theory and practical courses shall be one step ahead of the first year B.Sc. Courses based on content of first year shall be introduced.
At **third year under-graduation:** Two theory papers in each semester will appear as optional papers as part of B. Sc. Electronic Science. Proportionate number of laboratory exercises will be included in the laboratory course.

Objectives:

- To provide in-depth knowledge of technological aspects of electronics
- To familiarize with current and recent technological developments
- To enrich knowledge through programmes such as industrial visits (including visits to industrial exhibitions), hobby projects, market survey, projects etc.
- To train students in skills related to electronics industry and market.
- To create foundation for perfecting practical skills in Electronics
- To develop analytical abilities towards real world problems
- To help students build-up a progressive and successful career in Electronics

4) Eligibility:

1 **First Year B.Sc.:** Higher Secondary School Certificate (10+2) Science stream or its equivalent Examination as per the University of Pune eligibility norms.

2 **Second Year B.Sc.:** Keeping terms of First Year of B. Sc. with Electronic Science and Electronic Equipment Maintenance as two of the four subjects at F. Y. B. Sc.

level. Other students if they fulfill the conditions approved by the equivalence committee of Faculty of Science of the University of Pune are also eligible.

3 **Third Year B. Sc.:** Student shall pass all First Year B. Sc. courses and satisfactorily keeping terms of Second Year of B. Sc. with Electronic Science and Electronic Equipment Maintenance as two of the three subjects at S. Y. B. Sc. level.

Note: Admissions will be given as per the selection procedure / policies adopted by the respective college, in accordance with conditions laid down by the University of Pune. Reservation and relaxation will be as per the Government rules.

5 A) Examination Pattern:

First Year B. Sc. Electronic Science

Pattern of Examination: Annual

Theory courses (VOC-EEM-101): Annual (VOC-EEM-102): Annual

Practical Course (VOC-EEM-103): Annual

		Standard of passing	Total Number of lectures/practicals per Term	Title	Paper/ Course No.
Total marks out of **100**	External marks out of **80**	Internal marks out of **20**			
40 *	32	08	Three lectures/Week (Total 36 lectures per term)	Maintenance Concepts, Instruments and Appliances	Theory Paper I (VOC-EEM-101) (First term)
			Three lectures/Week (Total 36 lectures per term)	Electronic Components, Circuit and Equipment Assembly	Theory Paper I (VOC-EEM-101) (Second term)
40 *	32	08	Three lectures/Week (Total 36 lectures per term)	Maintenance Concepts, Instruments and Appliances	Theory Paper II (VOC-EEM-102) (First term)
			Three lectures/Week (Total 36 lectures per term)	Electronic Components, Circuit and Equipment Assembly	Theory Paper II (VOC-EEM-102) (Second term)

40 *	32	08	10 Practicals of 4 lectures in each term (20 practicals / year)	Practical	Practical Paper III (VOC-EEM-103) (First & Second Term)

* Subject to compulsory passing in external examination and getting minimum 40 marks out of 100

Notes:

1. Total marks: Theory (100 + 100) = 200 marks
2. Total marks per year 200 (Theory) + 100 marks (practicals) = 300 marks
3. Internal marks for theory papers given on the basis of internal assessment tests and for practicals on internal assessment tests + journals + attendance + study visit reports/ market survey/ hobby projects etc.

Theory examination will be of three hours duration for each theory course. There shall be 5 questions each carrying equal marks. The pattern of question papers shall be:

8 sub-questions, each of 2 marks; answerable in 2 -3 lines and based on entire syllabus	Question 1
4 out of 6– short answer type questions; answerable in 8 – 10 lines	Question 2, 3 and 4
4 out of 6 – problem type question; answerable in numerical or analytical fashion or circuit/logic diagrams	Question 5

Internal examination: Internal assessment of the student by respective teacher will be based on written test, 10 marks each term. The written test shall comprise of objective type questions – Multiple Choice Type Questions, True / False, Definitions, Answer in Two or three line question (Describe/Explain).There shall be 20 questions.
Practical: one internal assessment test + marks for journals + attendance + activity.

Practical Examination: Practical examination shall be conducted by the respective college at the end of the academic year. Practical examination will be of 6 hours duration (2-Sessions). Certified journal is compulsory to appear for practical examination. There shall be two expert and two examiners per batch for the practical examination.

Second Year B. Sc. Electronic Science

Pattern of examination: Semester

Theory courses (Sem I : VOC-EEM-211 and VOC-EEM-212): Semester

(Sem II: VOC-EEM-221 and VOC-EEM-222): Semester

Practical Course (VOC-EEM223): Annual

		Standard of passing	Total Number of lectures / practicals Per Semester	Title	Paper/ Course No.
Total passing marks out of 50 (theory) and out of 100 (practicals)	External marks out of 40 (theory) Out of 80 (practicals)	Internal marks out of 10 (theory) Out of 20 (practicals)			
20 *	16	04	Four lectures/Week (Total 48 per Semester)	Troubleshooting Electronic Equipment-A **Paper I**	Theory Paper I (VOC-EEM 211) Semester I
20 *	16	04	Four lectures/Week (Total 48 per Semester)	**Paper II** Audio, Video and Office equipment - A	Theory Paper II (VOC-EEM 212) Semester I
20 *	16	04	Four lectures/Week (Total 48 per Semester)	**Paper I** Troubleshooting Electronic Equipment-B	Theory Paper I (VOC-EEM 221) Semester II
20 *	16	04	Four lectures/Week (Total 48 per Semester)	**Paper II** Audio, Video and Office equipment - B	Theory Paper II (VOC-EEM 222) Semester II
40 **	32	08	12 Practicals of 4 lectures in each Semester (24 practicals / year)	**Paper III** Laboratory	Practical Paper III (VOC-EEM 223) Semester I & II

* Subject to compulsory passing in external examination and getting minimum 20 marks out of 50

** Subject to compulsory passing in external examination and getting minimum 40 marks out of 100

Notes:

1. Total marks: Theory for each semester (50 + 50) = 100 marks
2. Total marks per year 200 (Theory) + 100 marks (practicals) = 300 marks

3. Internal marks for theory papers given on the basis of internal assessment tests and for practicals on internal assessment tests + journals + attendance + study visit reports/ market survey/ hobby projects etc.

Theory examination will be of two hours duration for each theory course. There shall be 4 questions each carrying marks as per the table. The pattern of question papers shall be:

12 marks	4 sub-questions, each of 1 marks and 4 sub-questions, each of 2 marks on entire syllabus	Question 1
8 marks each	2 out of 3 sub-questions, each of 4 marks; short answer type questions; answerable in 8–10 lines	Question 2 and 3
12 marks	2 out of 3 sub-questions, each of 6 marks; long answer type questions (12-16 lines), problems, circuit/logic diagrams and designs	Question 4

Internal examination: Internal assessment of the student by respective teacher will be based on written test, 10 marks each Semester. The written test shall comprise of objective type questions – Multiple Choice Type Questions, True / False, Definitions, Answer in Two or three line question (Describe/Explain) There shall be 20 questions.
Practicals: one internal assessment test + practical journal + attendance + activity
Practical Examination: Practical examination shall be conducted at the respective college at the end of the academic year. Practical examination will be of 6 hours (2-Sessions) duration. Certified journal is compulsory to appear for practical examination. There shall be one expert and two examiners per batch for the practical examination. One of the examiners will be external.

Third Year B. Sc. Electronic Science

Pattern of examination: Semester

Theory courses:
(Sem III: VOC-EEM-335-VOC-EEM-336): Semester
(Sem IV: VOC-EEM-345-VOC-EEM-346): Semester
Practical Course:
(VOC-EEM347-VOC-EEM349): Annual

					Theory Papers
		Standard of passing	Total Number of lectures Per Semester	Title	Paper/Course No.

Total passing marks out of 50 (theory) and out of 100 (practicals)	External marks out of 40 (theory) Out of 80 (practicals)	Internal marks out of 10 (theory) Out of 20 (practicals)			
					SEM III
20*	16	4	48	Paper V	VOC-EEM-335
20*	16	4	48	Paper VI	VOC-EEM-336
					SEM IV
20*	16	4	48	Paper V	VOC-EEM-345
20*	16	4	48	Paper VI	VOC-EEM-346
					Practical Papers
40 **	32	08	12 Practicals of 4 lectures in each Semester (24 / year)	Practical Paper III	Part of EL-347 and EL-348 and EL- 349 (Semester III & IV)

* Subject to compulsory passing in external examination and getting minimum 20 marks out of 50

** Subject to compulsory passing in external examination and getting minimum 40 marks out of 100

Notes:

1. Total marks: Theory for each semester (50 $\times$ 6) = 300 marks
2. Total marks per year 600 (Theory) + 300 marks (practicals) = 900 marks
3. Internal marks for theory papers given on the basis of internal assessment tests and for practicals on internal assessment tests + journals + attendance + study visit reports/ market survey/ hobby projects etc.

Theory examination will be of two hours duration for each theory course. There shall be 4 questions each carrying marks as per the table. The pattern of question papers shall be:

12 marks	4 sub-questions, each of 1 marks and 4 sub-questions, each of 2 marks; on entire syllabus	Question 1
8 marks each	2 out of 3 sub-questions, each of 4 marks; short answer type questions; answerable in 8–10 lines	Question 2 and 3
12 marks	2 out of 3 sub-questions, each of 6 marks; long answer type questions (12-16 lines), problems, circuit/logic diagrams and designs	Question 4

Internal examination: Internal assessment of the student by respective teacher will be based on written test, 10 marks each Semester. The written test shall comprise of objective type questions – Multiple Choice Type Questions, True / False, Definitions, Answer in Two or three line question (Describe/Explain) There shall be 20 questions.
Practicals: one internal assessment test + practical journals + attendance + activity.

Practical Examination: Practical examination shall be conducted at the respective college at the end of the academic year. Practical examination will be of 6 hours (2-Sessions) duration. Certified journal is compulsory to appear for practical examination. There shall be one expert and two examiners per batch for the practical examination. One of the examiners will be external.

5 B) Standard of Passing:

i. In order to pass in the first year theory examination, the candidate has to obtain 40 marks out of 100 in each course. (Minimum 32 marks out of 80 must be obtained in the University Theory Examination.)
ii. In order to pass in the Second Year and Third Year theory examination, the candidate has to obtain 20 marks out of 50 in each course of each semester. (Minimum 16 marks out of 40 must be obtained in the University Theory Examination.)
iii. In order to pass in practical examination, the candidate has to obtain 40 marks out of 100 in each course. (Minimum 32 marks out of 80 must be obtained in the University Examination.)

5 C) ATKT Rules:

While going from F. Y. B. Sc. to S. Y. B. Sc. at least 8 courses (out of total 12) should be passed; however all F. Y. B. Sc. courses should be passed while going to T. Y. B. Sc.
While going from S. Y. B. Sc. to T. Y. B. Sc., at least 12 courses (out of 20) should be passed (Practical Course at S. Y. B. Sc. will be equivalent to 2 courses).

5 D) External Students: There shall be no external students.

5 E) Setting question papers:

F. Y. B. Sc.: For theory papers I and II annual question papers shall be set by the University of Pune and assessment done at the respective colleges. Questions should be designed to test the conceptual knowledge and understanding of the basic concepts of the subject. For Practical Paper III, papers shall be set by the University of Pune and assessment done at the respective colleges.

S. Y. B. Sc. and T. Y. B. Sc.: For theory papers I and II for each semester and also for the annual practical examination question papers set by the University of Pune. Centralized assessment for theory papers done as per the University instructions. Questions should be designed to test the conceptual knowledge and understanding of

the basic concepts of the subject. For Practical Papers, papers shall be set by the University of Pune and assessment done by the internal examiner and external examiner appointed by University of Pune.

5F) Verification and Revaluation Rules:
As per university Statues and rules for verification and revaluation of marks in stipulated time after declaration of the semester examination result.

6) Course Structure:

Duration: The duration of B.Sc. Electronic Science Degree Program with Vocational Electronic Equipment Maintenance as one of the subjects shall be three years.

a) Compulsory Papers **:** All Theory and Practical Papers

b) Optional Papers **:** Nil

c) Question Papers **:**

F. Y. B. Sc. Theory paper:
University Examination – 80 marks (at the end of 2nd term)
Internal Examination – 20 marks

S.Y / T.Y. - B.Sc. Theory paper:
University Examination – 40 marks (at the end of each term)
Internal Examination – 10 marks

F.Y. / S.Y / T.Y. - B.Sc. Practical Paper:
University Examination – 80 marks (at the end of 2nd term)
Internal Examination – 20 marks

d) Medium of Instruction: The medium of instruction for the course shall be **English.**

7) Equivalence of Previous Syllabus:

New Course (2013 Pattern)	**Old Course (2008 Pattern)**
VOC-EEM-101: Maintenance Concepts, Instruments and Appliances	Paper I: T & M Instruments and Consumer Products
VOC-EEM-102: Electronic Components, Circuit and Equipment Assembly	Paper II: Maintenance Concepts and Assembly Methods
VOC-EEM-103: Practical	Paper III: Practical

New Course (2014 Pattern)	Old Course (2008 Pattern)
Paper 1 Semester 1 VOC- EEM-211 Troubleshooting Electronic Equipment-A	Paper 1 Semester 1 VOC- EEM-211 Audio, Video and Office equipment - A
Paper 2 Semester-1 Voc-EEM-212 Audio, Video and Office equipment - A	Paper 2 Semester-1 Voc-EEM-212 Maintenance Concepts and Repair 2- A
Paper 1 Semester 2 VOC- EEM-221 Troubleshooting Electronic Equipment-B	Paper 1 Semester 2 VOC- EEM-221 Audio, Video and Office equipment - B
Paper 2 Semester-1 Voc-EEM-222 Audio, Video and Office equipment - B	Paper 2: Semester-2 Voc-EEM-222 Maintenance and repair of Audio, Video, office and communication equipment
Paper 3 Laboratory Voc-EEM-223	Paper 3 Laboratory Voc-EEM-223

8) University Terms: Dates for commencement and conclusion for the first and second terms will be declared by the University authorities. Terms can be kept by only duly admitted students. The term shall be granted only on minimum 75 percent attendance at theory and practical course and satisfactory performance during the term.

9) Qualification of Teachers: As per UGC rules and guidelines on the scheme of Vocationalization of First Degree Education enumerated in the booklet published by the UGC.

10) Detail Syllabus with Recommended Books:

S. Y. B. Sc (Vocational)
(Proposed to be implemented from June 2014)
Electronic Equipment Maintenance (EEM)
PAPER I: Semester 1 VOC- EEM-211 Troubleshooting Electronic Equipment-A

Objectives

1. To understand the concept of troubleshooting.
2. To study basic preparatory topics of components and their testing
3. To understand the troubleshooting procedures

12 Lectures	**Unit 1 : Fundamental Troubleshooting Procedures** Inside An Electronic Equipment: Reading Drawings And Diagrams – Block Diagram, Circuit Diagram, Wiring Diagram; Dis-assembly and re-assembly of equipment, Equipment Failures and causes such as poor design, production deficiencies, careless storage and transport, inappropriate operating conditions, Nature of faults, Fault location procedure, Fault finding aids – Service and maintenance manuals and instruction manuals, Test and Measuring instruments, special tools Troubleshooting techniques, Approaching components for tests, Grounding systems in Electronic Equipment, Temperature sensitive Intermittent problems Corrective actions, Situations where repairs should not be attempted
18 Lectures	**Unit 2 : Passive Components and Their Testing** Passive Components- Resistors, Capacitors, Inductors Failures in fixed resistors, testing of resistors, variable resistors, variable resistors as potentiometers, failures in potentiometers, testing of potentiometers, servicing potentiometers, LDRs and Thermistors Types of capacitors and their performance, Failures in capacitors, testing of capacitors and precautions therein, variable capacitor types, Testing of inductors and inductance measurement
18 Lec	**Unit 3 : 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

tures	

PAPER I: Semester 2 VOC- EEM-221 Troubleshooting Electronic Equipment-B

Objectives

1. To study the digital circuits from troubleshooting point of view
2. To study the technique of SMD rework and repair
3. To gain further understanding of troubleshooting by studying examples

12 lectures	**Unit 1 : 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
10 lectures	**Unit 2 : Rework and Repair of Surface Mount Assemblies** Surface Mount Technology and surface mount devices Surface Mount Semiconductor packages – SOIC, SOT, LCCC, LGA, BGA, COB, Flatpacks and Quad Packs, Cylindrical Diode Packages, Packaging of Passive Components as SMDs Repairing Surface Mount PCBs, Rework Stations
26 lect	**Unit 3: Examples of Troubleshooting** Power supply Circuits – Types of Regulators, Power Supply Troubleshooting, SMPS, High Voltage DC Power supplies Oscilloscope – Fault Diagnosis chart, CRT replacement

u r e s	Cordless Telephone – Principle of Operation using detailed functional block diagram, Troubleshooting and maintenance of cordless telephone Mobile Phone – faults in microphone, earpiece, ringer, vibrator etc and solutions Digital Still Camera – typical faults and troubleshooting

Recommended Books:

1. Modern Electronic Equipment: Troubleshooting, Repair and Maintenance by Khandpur, TMH 2006
2. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting by R. G. Gupta Tata McGraw Hill Edition 2001
3. Student Reference Manual for Electronic Instrumentation Laboratories by Stanley Wolf, and Richard F. M. Smith, Prentice Hall of India Pvt. Ltd. New Delhi
4. Consumer Electronics by S. P. Bali, Pearson
5. Opamps - Design, Application and Troubleshooting by David L Terrell, Butterworth-Heinemann
6. Electronic Testing and Fault Diagnosis by G. C. Loveday, A. H. Wheeler Publishing

S. Y. B. Sc. (Vocational)
(Proposed to be implemented from June 2014)
Electronic Equipment Maintenance (EEM)

PAPER 2 Semester 1 VOC- EEM-212 Audio, Video and Office equipment - A

Objectives

1. To make the student aware of working principles of modern communication receivers and to impart technical knowledge of their construction as a preparation for being able to learn fault location and troubleshooting.
2. To make the student familiar with construction and working of different audio and video systems in preparation of learning their troubleshooting and maintenance.
3. To provide the students adequate knowledge of latest applications of video and TV systems.

24 Lectures	**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. Audio tape recorder and principles of recording of electrical signal on magnetic tape. Construction of R/P head and erase head. High fidelity music systems and functions in them. (Brief Review) Principles of recording and replay of audio CD and ACD player. Blu-Ray player, Home theater, Car entertainment system, Remote controls for these units MP3 compression and its use. MP3 player, process of downloading songs in it. Different audio file formats and their comparison. Typical Automotive infotainment system - block diagram Public address system and its components and types.
24 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 colour TV transmission and PAL-B colour standard. Block diagram of

	colour TV. B/W and color picture tubes. (Brief Review) 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. Basic information of VCD and DVD. Block diagram of VCD player and DVD player. Applications of TV: CCTV and CATV. Other application areas for TV such as education, underwater and in nuclear installations.

Paper 2 Semester 2 VOC- EEM-222 Audio, Video and Office equipment – B

1. To inform the student about different types of display techniques and data projectors used, their setting up procedure and maintenance.
2. To impart adequate technical knowledge about latest personal computer and peripherals from the point of view of maintenance and troubleshooting.
3. To introduce troubleshooting procedures for office equipment such as FAX and Photocopying machines.

24 Lectures	**Unit I : Construction, principle of working and typical applications of:** Display techniques Construction, working principle and applications of: Concept of multimedia and softwares involved in its development. Multimedia / Data projector, LCD and DLP projectors, large screen and rolling display, slide projector and overhead projector
24 Lectures	**Unit II: Construction, working principle and applications of:** Desktop PC, CPU, connectors on the CPU, motherboard, latest processors and peripherals. Video adapters and color display standards. Printers-dot matrix, inkjet, laser. Concept of barcode-Barcode printers and different types of barcodes and readers for them. Different types of scanners, FAX machine, Photocopying machine, EPABX system PC peripherals such as keyboard, different types of mouse, monitors-CRT and

	LCD. Light pen, memory card reader, Touch Screen and their applications. Block diagram of Laptop computer. Peripherals for use in Laptop computer. Use of LCD TV as a PC

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

Useful websites:

http://www.pssurvival.com/PS/Electronic/Repair/Troubleshooting_And_Repair_Of_Consumer_Electronics_Equipment_2004.pdf

http://www.repairfaq.org/sam/electron/basicelectr.pdf

http://www.repairfaq.org/samnew/printfaq.htm

http://www.howstuffworks.com/
http://in.rsdelivers.com/
http://www.vishay.com/
http://www.hardwarebook.info/
http://www.digikey.com/Web%20Export/Supplier%20Content/BUD_377/PDF/Bud_handbook.pdf?redirected=1
http://www.semicon.panasonic.co.jp/ds8/c0/T12010E.pdf
https://www.silabs.com/Marcom%20Documents/Resources/automotive-applications-guide.pdf
https://www.infineon.com/dgdl?folderId=db3a30431c48a312011c6695d55802cb&fileId=db3a30431c48a312011c6696b47402cc
http://booksite.elsevier.com/9781856176781/on02-ch17-01-31-9781856176781.pdf
http://www.edb.utexas.edu/minliu/multimedia/PDFfolder/CompareMusic.pdf

S. Y. B. Sc. (Vocational)
(Proposed to be implemented from June 2013)
Electronic Equipment Maintenance (EEM)

PAPER III: Practical
Objectives

- To acquire skills of proper use of the tools, equipment etc.
- To acquire skills of circuit assembly and disassembly.
- To gain hands on experience in handling consumer and office electronic equipment.
- To learn systematic approach to fault location and troubleshooting.
- To gain expertise in the use of test equipment.
- To gain practice in circuit board tracing and identification of circuit blocks.
- To acquire skills of referencing from data-books, operating instruction manuals and other referencing material.
- To develop technical report writing skills by creating professional laboratory reports and PowerPoint presentations.
- To learn to make efficient use of computers for supporting various laboratory exercises related activities.
- To inculcate good, safe and disciplined work practices.
- To be aware of the importance of cost effective work practices by avoiding wastages and by recycling of material.
- To learn to carry out error assessment and analysis and to learn to draw inferences based on the same.

  Group Discussions are recommended for creating a general atmosphere to appreciate and practice the points mentioned here.

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Electronic Equipment Maintenance (EEM)

PAPER III: Practical

Identification of functional blocks / sections, assembly and testing of semi knocked down (SKD) kits, troubleshooting and fault location.	**Group A**
AM/FM radio receiver and its alignment.	**1**
Music system: Study of hi-fi amplifier {LM 380}, stereo system, graphic equalizer, speaker system	**2**
Colour TV receiver: Observation of waveforms and voltages at various test points.	**3**
Tracing and study of block diagram of LCD TV/ Plasma TV.	4
Setting up, preventive maintenance, minor repairs and fault identification.	**Group B**
ACD player: Identification of parts, study of various controls.	5
MP3 player: Study of block diagram and various controls, downloading of songs	**6**
VCD/DVD player: Identification of parts, study of various controls	**7**
Site preparation, installation/study of preinstalled system, identification of blocks	**Group C**
PA system	**8**
CCTV study of practical arrangement in public places, cameras used, range, coverage, area etc	**9**
Data/Multimedia Projector: Setting up and connections to PC.	10
Identification of functional blocks/sections, preventive maintenance and minor repairs.	**Group D**
Multimedia Projector	11
Mobile Phone – identification of parts, dismantling and reassembling of latest smart phones	12
EPABX and its programming	13
Identification of functional blocks/sections, preventive maintenance and minor repairs.	**Group E**
Study of motherboards with latest processor including Intel, CMOS setup,	14

Troubleshooting of a PC	
Scanner	15
FAX/Multifunction machine	16
Identification of functional blocks/sections, electrical interconnections, preventive maintenance and installation of drivers	**Group F**
Dot Matrix Printer	17
Inkjet Printer	18
Laser Printer	19
Study of Print/FAX/Scan/Copy unit	20

- Safe working practice drill is desired on more than one occasion per term.
- In each experiment use of datasheet/operating instruction manual is mandatory.
- Hand tool practice exercise is desired as a preparatory exercise.

Note:

These and any other equivalent experiments with a view to inculcating good, safe and disciplined work practices are desired.