

Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon

Ordinance 181

College Name : **PSGVPM'S S. I. Patil Arts, G. B. Patel Science & STKVS
Commerce COLLEGE SHAHADA**

Title of the course : **ELECTRONICS INSTRUMENTATION
(Repairing & Maintenance)**

Aim/Objective of the course :

- 1) To develop and consolidate the basic electronics and instrumentation skills.
- 2) To introduce wide range of technique useful for repairing and maintenance.
- 3) To develop the awareness of the various newly electronics instruments and SMDs components.
- 4) Preparing students to take their rightful place in society as competent, concerned and responsible citizens.
- 5) To enable students to acquire basic skills, employable skills, knowledge and understanding the various instruments.

Duration of the course : One year

Course structure : 1) Paper-I Repairing & Maintenance of electronics instruments
2) Paper-II Repairing & Maintenance of Telephone & cell phone.
3) Paper- III Practical course in Electronics and Instrumentation

Eligibility of admission : XIIth Science

Skeleton of course :

Sr. No	Paper	Name of the subject	Theory/Practicals	Teaching Hours	Maximum marks allotted			Passing			Credit
					External	Internal	Total	External	Internal	Total	
1	Paper-I	Repairing & Maintenance of electronics instruments	Theory	90	60	40	100	24	16	40	6
2	Paper-II	Repairing & Maintenance of Telephone & cell phone	Theory	90	60	40	100	24	16	40	6
3	Paper-III	Practical course	Practical	120	60	40	100	24	16	40	8

Internal Marks are divided in 3 parts e.g. 05 marks for attendance,10 marks for Home Assignment Tutorial & 25 marks for Internal Test.

Minimum Staff: 02

Course Fee : 2000/-

Mode of Examination : Annual

Detail syllabus: As follows

**Certificate Course in
Electronics and Instrumentation
(Repairing and Maintenance)**

PAPER I: Repairing & Maintenance of Electronics Instruments.

Periods: 90 Hr.

1. SEMICONDUCTOR FUNDAMENTAL. (P-7)

Introduction to semiconductor, semiconductor materials, silicon, germanium atoms, crystal structure, N and P type of semiconductor.

2. DIODE AND TRANSISTOR. (P-8)

Diode - semiconductor diodes, operation, defects and testing of diodes, transistor operation, defects and testing of PNP and NPN transistors. In circuit testing of transistor – turn - off test and turn - on test. Important characteristics of transistor, current gain factors (alpha and beta), input resistance, output resistance, Transistor as an amplifier.

3. TRANSISTOR RADIO COMPONENTS (P-8)

Transistor and taking out leads, diode and taking out leads. Resistor: Fixed and variable resistors, potentiometer, values of resistors, color code and power rating, defects, testing and replacing of resistor, NTC, PTC, Thermistor. Condensers: Fixed and variable condenser, gang condenser, trimmer, their construction, defect and testing. Coil- Construction, defect and testing. Switches- Band switches (wafer switch, sliding switch, push button switch) their construction, defect and testing.

Transformer – IF transformer, construction and defect, audio transformer identifying the driver and output transformer, testing and replacing Mains transformer, Loud speaker: Defect, testing and replacing, Circuit symbols and component values.

4) TESTING INSTRUMENTS. (P-7)

Multimeter: Current and voltage range, measuring resistance, application of multi-meter and precautions while using multimeter.

5) TRANSISTOR CIRCUIT PRINCIPLES (P-7)

Common-Emitter, Common-Base and Common Collector circuit, practical circuit base biasing arrangement, audio and radio frequency amplifier circuit, multistage amplifier and de-coupling, Negative feedback.

6) POWER INVERTER SERVICING

A) Introduction to inverter (P-8)

Generator V/s Inverter, AC/DC Supply problem and solutions. Block diagram of inverter and function of each block

B) Components in inverter (P-8)

Battery– Introduction, types, rating, battery charging in an inverter, a simple battery charger, checking battery acid level, battery water level.

Transistor– Working of transistor, transistor as an amplifier, transistor as a switch, types testing of transistor.

RELAY– Construction and classification, relay operating speed

TRANSFORMER– Construction and types of transformer

POWER SUPPLY– Rectifier circuits, filter circuits, regulators.

C) BASIC PRINCIPLE OF INVERTER (P-7)

Inverter using two transistor and single transformer, oscillator using 555 timer, CD 4047, MM 5369, amplitude amplifiers, Op-Amp. IC 741.

Operating frequency and wave shapes of inverter, square wave or sine wave.

D) INVERTER and INSTALLATION (P-8)

60W/6V, IC 555 Timer driven inverter

100 W / 12 V IC 555 Timer driven inverter

100 W/ 12 V, inverter using IC CD 4047

400 W/ 24 V using IC 555 timer

200 W/ 12 V/ 120 AH inverter – circuit, operation, fault finding and repairing

Deciding inverter rating – calculation of power consumption, power consumption table

7) LOCATING THE FAULTY STAGES (P-8)

Locating the defective stage, Testing techniques- Signal substitution testing, disturbing, signal tracing and stage shorting.

Testing by measuring voltages at various points,

Testing by measuring current of various stages.

Testing by measuring resistance.

9) SERVICING (P-7)

Replacing defective components, soldering, servicing printed circuit board, repairing PCB.

Pointer driver arrangement – pointer driving arrangement of some models of transistor radios.

10) IC CIRCUITS AND THEIR APPLICATIONS (P-7)

Analog & Digital ICs and their applications and testing of voltages at different locations.

REFERENCE BOOKS

- 1) Practical transistor radio servicing – Vijay (Hindu Pustak Bhandar)
- 2) Basic Electronics and transistor radio- K C Agarwal (Micro publications)
- 3) Basic Electronics & Integrated circuits- Millikan & Halkies.
- 4) Electric & Electronics Instrumentation – A. K. Sawhney.

PAPER II: Repairing & Maintenance of Telephone and Cell Phone

Periods: 90Hr.

TELEPHONE SERVICING

- 1) INTRODUCTION TO PHONE SYSTEM (P-8)**
Telephone system, Telephone set, Telephone Exchange, initiating a call. Calling a number, signal to / from exchange, making connection, answering a call, conversation ending the call.
- 2) CONVETIONAL TELEPHONE SET FUNCTION (P-7)**
Switch hook, dialling , transmitter , receiver , ringer , side tone , a rotary dial phone set.
- 3) AN INTIRGRATED TELEPHONE CIRCUIT USING IC & WIRELESS PHONE SYSTEM (P-8)**
Telephone circuit, components of the Motorola MC 34010 IC based electronic telephone Cord less telephone, Mobile telephone
- 4) TELEPHONE PROJECT (P-7)**
Telephone bug automatic call recorder, electronic (Circuit, test and adjustment and installation) phone lock, Telephone hold music.
- 5) BPL TELEPHONE MODEL (P-7)**
Circuit description and troubleshooting guide.
- 6) TELEPHONE SERVICING (P-8)**

Some common complaints, Dialer section faults, Ringers section faults, speech section

CELL PHONE SERVICING

- 1) INTRODUCTION TO CELL PHONE (P-8)**
Cell phone system, Calling a number, making connection, answering a call, conversation, ending the call.
- 2) CONVETIONAL TELEPHONE SET FUNCTION (P-7)**
Dialling, Transmitter, Receiver, ringer, side tone, a cell phone set.
- 3) INTERGRATED TELEPHONE CIRCUIT USING IC & DISPLAY (P-8)**
Telephone circuit, components of the IC based electronic cell phone Display, Types of Display, Construction and working of Display.
- 4) APPLICATIONS OF CELL PHONE (P-7)**
Types of Cell phone and their Uses or Applications .
- 5) SAMSUNG CELL PHONE MODEL (With and Without Android) (P-7)**

Circuit description and troubleshooting guide.

6) CELL PHONE SERVICING

(P-8)

Cell phone Circuit, test, adjustment and installation. Some common complaints, Dialer section faults, Ringers section faultsspeech section, Display section, storage and general operating.

REFERENCE BOOKS

- 1) Modern power inverter – Manohar Lotia (BPB Publication)
- 2) Modern Telephone and Cord less Servicing, Manual- Manohar lohia(BPB Publication)
- 3) 1000 inverters – M. L. Chanda. (Engineer’s publication)
- 4) High frequency inverter - S. K. Gupta (G. T. Publication)
- 5) High Wattage inverters – S.K. Gupta (G. T. Publication)

PAPER - III Practical Course

Electronics and Instrumentation (Repairing and Maintenance)

Periods: 120 Hr.

INVERTER SERVICING

1. Identification and testing of inverter components and telephone system components
2. Build and test half wave, and full wave/ bridge rectifier circuit.
3. Build and test zener regulator circuit.
4. Build and test regulated power supply using 3 terminal IC regulator
5. Build and test simple inverter using IC 555.
6. Identification and tracking of stages in inverter and its installation (e.g.200W/12V/120AH)
7. Detect and remove faults in different stages of inverter (e.g. 200W/12V/120AH)

TELEPHONE and CELL PHONE SERVICING

8. Demonstration of various stages of telephone system.
9. Tracing and testing of telephone bug and automatic call recorder circuit.
10. Detect and remove faults in telephone system (e.g. BPL telephone model)
11. Various functions of Simple and Android Cell Phone.
12. Demonstration of Various Applications of Cell phone.
13. Tracing and testing of Display section of Cell Phone.
14. Tracing and testing of Key pad, Audio and Battery section.
15. Detect and remove faults in Cell phone (e.g. SAMSUNG cell phone model).

Certificate Course

Electronics and Instrumentation (Repairing and Maintenance)

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Duration of the course : One Year

Course Structure: 1) Paper-I Repairing & Maintenance of electronics instruments (6Credits)

2) Paper-II Repairing & Maintenance of Telephone & cell phone. (6Credits)

3) Practical course III (8Credits)

Eligibility of admission : XIIth

Course Fee : 2000/-

Mode of Examination : Annual