Department of Physics (B. Sc. I)

1. **TITLE:** Instrumentation measurements and Analysis
2. **YEAR OF IMPLEMENTATION**: 2018
3. P**REAMBLE**:

Advance Diploma in Instrumentation measurements and Analysis is three year integrated course for under graduate students. The students from physic should be competent about handling and measurements of various instruments.

In this advance diploma course students will be able to understand basics of instruments used in physics.

4. **GENERAL OBJECTIVES OF THE COURSE**:
   1) To enhance the students practical knowledge.
   2) To make the students aware about handling of instruments.
   3) To make them aware of basic components.
   4) To provide technical knowledge of electrical and electronic instruments.
   5) To provide the technical knowledge to repair minor instruments.
5. **DURATION:** One Year
6. **PATTERN:** Annual
7. **MEDIUM OF INSTRUCTION:** English
8. **STRUCTURE OF COURSE:**

Paper No and Name
C PT101: Basic components & instruments
C P L102: Practical Techniques in Basic components & instruments
C PP103: Projects in Instruments

CPT 101: Basic components & instruments Learning Objectives (Credits: 4)

Students will able to:

1. understand the basic physics instruments.
2. study electronic components.
3. study characteristics of electronic component

Unit I: Measuring Instruments (16)

Error Analysis, Meter scale, Vernier caliper, Micrometer screw gauge, Spectrometer, voltmeter, ammeter, Multimeter and their utility.

Unit I: Passive electrical components (12)

Resistors and its type, capacitors and its types, inductors and its types, Transformers and its types.

Unit III: Active electronic components (12)

Semiconductor diodes, Zener diode, bipolar junction transistors, theory and working of each components.

Unit IV: Rectifiers and filters (8)

Half wave rectifier, Full wave rectifier, Bridge rectifier, Filters.

Reference: - 1) A textbook of electrical technology – A.K.Theraja
2) Electronic principles – Malvino
3) Instrumentation – Cooper

CPP 101: **Practical Techniques in Basic components & instruments (Credits: 2)** **(96)**

1.Least count calculation of given instruments
2.Resistance and capacitors Colour code
3.Identification of resistors, Capacitors, inductors and their values
4. Diode characteristics
5.Zener diode characteristics
6.Transistor characteristics in CE mode
7.Series and parallel combination of resistors
8.Series and parallel combination of capacitors
9.Testing of electronic components with multimeters (Diode, Zener diode, Transistors)
10. Measurement of dimensions of cylinder, thin wire, metal sheet
11. Measurement of diameter of a capillary bore
12. Calibration of spectrometer
13. Kirchhoff's laws
14. Ohm's law
15. Measurement of resistance, current, voltage using multimeter.
16. Half wave rectifier
17. Full wave rectifier
18. Bridge rectifier with filter.
19. Measurement of resistance using post- office box.
20. Transfer characteristics of transistor in CE mode.
21. LR circuit - Impedance calculation
22. LC circuit - Impedance calculation
23. RC circuit- Impedance calculation
24. LCR series circuit- Impedance calculation

CPP103**: Projects (Credits: 2)** **(24)**