

KisanShikshanSansthaWalwa
KRANTISINH NANA PATIL COLLEGE WALWA
DEPARTMENT OF Physics
VALUE ADDED COURSE
For B. Sc.IIIPhysics
Course Code: VA-008
Course Name:-Value Added Course on
BASIC INSTRUMENTS IN PHYSICS
Year 2022-23

Objectives:

The Value Added Courses on “**Basic Instrumentation in Physics**” aim to provide additional learner centric graded skill oriented technical training, with the primary objective of improving the employability skills of students. The main objectives of the program are:

To provide students an understanding of the expectations of industry.

To improve employability skills of students.

To bridge the skill gaps and make students industry ready.

To provide an opportunity to students to develop inter-disciplinary skills.

Learning Outcomes:

This course is to get exposure with various aspects of instruments and their usage through hands-on mode.

Course Guidelines and other details:

- **Title of the Course** : Value Added Course on
BASIC INSTRUMENTS IN PHYSICS
- **Coordinator** : Dr. PatilSarjeraoBalkrishna
- **Year of Implementation** : 2022-23.
- **Programme Duration & Hours** : Dec. 2022 to Feb. 2023 Hours 32
- **Theory and Practical Lectures** : Total 32 hours.
- **Intake** : 20 students.

Title of the Course: Value Added Course on
BASIC INSTRUMENTS IN PHYSICS

Course Contents:

Sr. No.	Topics (Theory and Practicals)	Hour(s)
1.	Basic of Measurement: Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects.	02
2.	Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance	02
3.	Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity	02
4.	Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance	02
5.	AC millivoltmeter: Type of AC millivoltmeters. Block diagram ac millivoltmeter, specifications and their significance.	02
6.	Oscilloscope: Block diagram of basic CRO.	01
7.	CRT, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), Time base operation, synchronization.	02
8.	brief discussion on screen phosphor, visual persistence, Front panel controls	02
9.	Specifications of CRO and their significance. Use of CRO for the measurement of voltage (dc and ac), frequency and time period	02
10.	Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: principle of working.	02
11.	. Signal and pulse Generators: Block diagram, explanation and specifications of low frequency signal generator and pulse generator.	02
12.	Brief idea for testing, specifications. Distortion factor meter, wave analysis.	02
13.	Impedance Bridges: Block diagram of bridge. working principles of basic (balancing type) RLC bridge.	02

14.	Specifications of RLC bridge. Block diagram and working principles of a Q-Meter. Digital LCR bridges.	02
15.	Digital Instruments: Comparison of analog & digital instruments. Characteristics of a digital meter.	01
16.	Working principles of digital voltmeter.	01
17.	Digital Multimeter: Block diagram and working of a digital multimeter.	01
18.	Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time-base stability, accuracy and resolution.	02
	TOTAL	32

Project / Practical

1. Use of an oscilloscope.
 2. CRO as a versatile measuring device.
 3. Use of Digital multimeter/VTVM for measuring voltages
 4. Winding a coil / transformer.
 5. Trouble shooting a circuit
 6. Balancing of bridges
 7. Measurement of voltage, frequency, time period and phase angle using CRO.
 8. Measurement of rise, fall and delay times using a CRO.
 9. Measurement of R, L and C using a LCR bridge/ universal bridge.
- Teaching Resources:

REFERENCES:

1. A text book in Electrical Technology - B L Theraja - S Chand and Co.
2. Performance and design of AC machines - M G Say ELBS Edn.
3. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
4. Logic circuit design, Shimon P. Vingron, 2012, Springer.
5. Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
6. Electronic Devices and circuits, S. Salivahanan & N. S. Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill

Course Evaluation:

Students will be evaluated on the following parameters:

Sr. No	Particulars	Marks	Weightage
1.	Attendance	50	50%
2.	Final Evaluation	50	50%

COURSE COORDINATOR: Dr. S. B. Patil

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