MGSC – B.Sc. – Physics Curriculum 2024 OBE Pattern
Semester 1
Skill Enhancement Course-116(T+P)
(SEC Course – 2 Credits)(Implemented from 2026-2027)

Semester: 1 NEP-2020	Course No.: 116(T+P)	Course Category: SEC Course Code: PHSEC(T+P) Credits: 2 CourseTitle:Basic instrumentation, Measurement and Analysis

Course Objectives:

Vernier Calliper and Micrometer Screw:

Learn the principle of Vernier scale for precise measurement. Use Vernier callipers to measure internal and external diameters, thickness, and depths accurately.

Understand the working and applications of micrometer screw gauge for measuring smaller dimensions than Vernier callipers.

Develop skills to handle measurements with minimal errors and uncertainties.

Travelling Microscope:

Understand the structure and working of a travelling microscope, including the use of Vernier scales and micrometer screws for fine measurements.

Measure small distances and diameters with a precision in the order of 0.01mm.

Spectrometer:

To learn the functions of spectrometer components.

To practice setting up and adjusting a spectrometer, including the collimator, prism table, and telescope.

To observe the spectrum produced by a light source such as a mercury or sodium lamp.

To measure angles such as the angle of minimum deviation and the angle of the prism.

To determine the refractive index of the prism material from these measurements.

Course Outcomes: On successful completion of the course, learners will be able to

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CO1	Set up the instruments as per the instructions, Remember how to find least count measurement(LCM)	Remember Understand
CO2	Develop measurements techniques, record observations, use the given formula, do calculations and draw your conclusion from the result.	Understand APPLY
CO3	Find uncertainty involved in the observations	Evaluate
CO4	Analyse the observations for scientific inference	Analyse

Syllabus:

Theory hours(15) **Practical Hours(30)**	
Unit-1 **Vernier Callipers:** Introduction Theory, Figure, Description of the instrument, Detail study of least count, Error, Positive error, Negative error Determination of magnitude of positive and negative errors. Some limitations of Vernier Callipers. Application of Venire Callipers. Limitation Experiments: To measure thickness of given slab and inner and outer diameter of given ring. **Micrometer screw:** Introduction , theory, figure, description of the instrument, definition of pitch , and its determination. Study of least count, meaning of the error and explanation of positive and negative errors. Determination of positive and negative errors. Method of taking observation with the help of micrometer screw. Application of micrometer Screw. Some Limitations of screw gauge Experiments: To find diameter of wire and thickness of thin sheet and other given object. **Unit-2** **Travelling Microscope:** Introduction, Construction and main part of travelling microscope, vertical and horizontal scale of microscope, least count of scale. Application of travelling microscope, Precaution to be taken in measurement. Experiment: To Measure the diameter of Rubber tube and distance of given objects. **Spectrometer:** Introduction, Description of the instrument, Construction and explanation of three main parts of spectrometer. Mercury discharge lamp, Sodium discharge lamp, study of least count, The Adjustment, levelling and method of recording the observation of spectrometer, application and experimental work.	

Reference Book1. Fundamentals of Venire Callipers and Screw Gauge by Rajesh Mishra
2. Basics in Metrology and Measurements by Dr. R. Venkat Reddy