UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN PHYSICS

SYLLABUS WITH EFFECT FROM 2023-2024

137S2B

COURSE	**SKILL ENHANCEMENT COURSE-3**
COURSE TITLE	**INSTRUMENTATION**
CREDITS	2
COURSE OBJECTIVES	To study the instrument with its principle and observe the method of their functioning. To provide a good foundation in measurements. To inspire interest in the knowledge of concepts regarding measurements.

UNITS	COURSEDETAILS
UNIT-I	**PERFORMANCECHARACTERISTICSOFAN INSTRUMENTATION SYSTEM** Introduction–System configuration–Problem Analysis–Basic Characteristics of measuring devices–Calibration - Generalized measurement-Zero order system-Second order system-Dead time element–Specification and testing of dynamic response.
UNIT-II	**SENSORSANDTRANSDUCERS** Basic principles of sensors-pressure sensor(Strain Gauge)-IR sensor-Characteristics of transducers–variable resistance transducer–variable capacitance transducer–Voltage and current transducer.
UNIT-III	**DIGITALINSTRUMENTS** Introduction–Digital Multi meter–Digital panel meter–Digital frequency meter-Digital measurement of time-Universal counter-Digitaltachometer-DigitalPHmeter.
UNIT-IV	**MEDICALINSTRUMENTATION** ECG-EEG-Lead systems and recording methods-typical waveforms-X-ray machine-Digital Stethoscope-Computer tomography-MRI–Ultra sonography-Thermography-Pacemakers-Ventilators-Dialyzers.
UNIT-V	**GASANALYSERSANDPOLLUTIONMONITORING INSTRUMENTS** Typesofgasanalysers-Oxygen,NO2andH2Stypes-IRanalyser-Air pollution standards-Air pollution detector–Dustand smoke detector-Radiation monitoring instruments–Area radiation dosimeter–personal Radiation dosimeter-radiation warning alarm.

TEXT BOOKS	1.E.A.Doebelin,MeasurementSystems-ApplicationsandDesign,Tata McGraw Hill,(1990) 2.CSRangan,GRSharma,V.S.V.Mani,InstrumentationDevicesand Systems, Second Edition, Tata McGraw Hill, (2011) 3.R.S.Khandpur, Hand book of Analytical Instruments, Tata McGraw Hill(2003).
REFERENCE BOOKS	1. D.Patranabis, Sensors and Transducers, Prentice Hall of India,(1999) 2. M.Arumugam, Bio-medical Instrumentation, Anuradha Agencies, (2002) 3. John G.Webster, Medical Instrumentation: Application and Design, John Wiley &Sons Inc (2009) 4. JohnP.Bentley Principles of Measurement Systems, Third Edition, Pearson Education,(2000)

METHOD OF EVALUATION:

Continuous Internal Assessment	End Semester Examination	Total
25	**75**	**100**