4137 – ELECTRONIC MEASUREMENTS

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
3	2	5	25	25	3 Hrs	100	50	200

Pre-requisite	Source	Semester	Theory	Test	Total	TW	PR	Gr Total
4212	EXN		75	25	100	25	–	125

Rationale: Study of basic electronic instrument forms the first step to electronics insight. Various basic instruments and its measurement techniques are dealt with in this course.

COURSE CONTENTS	Hrs	Mks
1. INTRODUCTION Performance characteristics, Static and dynamic characteristics, Errors in measurement, types of errors, sources of errors, standards, Frequency and time standards, electrical standards.	5	10
2. ANALOG MEASURING INSTRUMENTS Basic principle of PMMC, Ammeters and Voltmeters (AC & DC), Ohmmeters. Multimeters, extension of ranges. Effect of loading, calibration of meters, Transistor Voltmeter, FET Voltmeter.	10	20
3. AC AND DC BRIDGES Introduction, Whetstones Bridge, Kelvin Bridge, Kelvin double bridge, Maxwell's Bridge, Measurement of L, C, R and Q.	6	15
4. OSCILLOSCOPE Introduction, basic principle, CRT features, study of CRO block diagram, its typical circuits, measurements using CRO, Lissajons patterns. Types of CRO, triggered sweep generation. Dual trace/ beam CRO.	12	25
6. DISPLAY DEVICES Classification, Working principle of LED, LCD, seven segments, dot matrix display, bar graph displays.	5	10
Total	48	100

PRACTICALS:

Eight experiments on the following topics	turns
1. Study of basic PMMC, using PMMC to measure current, voltage, and resistance. Extension of ranges. Calibration of meters.	3
2. Study of Multimeter. Measurement of current, Voltage, Resistance, Short circuit, Open circuit, Low resistance, insulation.	3
3. Study of bridges, measurement of R, L, C and Q.	5
4. Study of Oscilloscope. Measurement of Voltage, Current, Measurement of frequency, time, phase shift using Lissajous pattern. Testing of components using CRO	5
5. Study and use of Signal generator.	2
6. Study of display devices.	2

TEXT BOOKS:

1. Electronic Instrumentation and measurement techniques by W.D. Cooper and A.D. Helfrick.
2. Electrical & Electronic Measurement by A.K. Sawhney.

REFERENCE BOOKS:

1. Electronic Measurement & Instruments by Terman & Petit.
2. Electronic Instrumentation by H.S. Kalsi