BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

Instruction Division
First Semester 2016-2017
Course Handout (Part II)

Date: 01.08.2016

In addition to Part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : INSTR F311
Course Title : Electronic Instruments and Instrumentation Technology
Instructor-in-charge : H.D.Mathur
Lab Instructor : Ankush Jahagirdar, Tulsi Ram Sharma, Satish Mohanty.

1. **Scope and objective of the course:**
   The course aims to deal with the following:
   a) Instrument design aspects, techniques and specifications of electronic instruments
   b) Industrial Communication
   c) Instrumentation for typical industries
   The course will consist of lectures, laboratory practice and lab assignments.

2. **Text Books:**
   M.M.S.Anand, Electronic Instruments & Instrumentation Technology, PHI, 2005.

3. **Course Plan:**

Lect. No.	Learning Objectives	Topics to be covered	Ref. Chapter (T)
1 – 2	To study basic analog meter	Ammeter, Voltmeter, Ohmmeter, Multimeter	1.1 - 1.4
3 – 4	To study electronic analog meters	Electronic AC & DC meters, Electronics Ohmmeter	1.6
5 – 6	To study electronic Digital meters and its calibration	Digital meter and calibration	2.1, 2.5, 2.6
7	To study different types of passive attenuators	Passive attenuators, L- type, pi-type, T-type, Padding	Appendix A
Self Study	To study digital storage Oscilloscope	Digital storage oscilloscope, Digital phosphor oscilloscope, Controls of an oscilloscope	3.2, 3.4, 3.5, 3.6
8-9	To study Probes	Types of probes, loading, measurement effects	4.1, 4.2, 4.3
10	To study DC bridges.	Wheatstone bridge & Kelvin bridges	5.2
11 – 12	To study AC bridges.	Limitations of AC Bridges – Wagner Ground connection, Anderson loop, LCR Bridge	5.3, 5.4, 5.5
13-15	To study instrument transformer and its application	Current and potential transformer, construction, working and application	Study Material
16 – 17	To study types of sine wave	Audio and radio frequency signal	7.1-7.4, 7.6

Lect. No.	Learning Objectives	Topics to be covered	Ref. Chapter (T)
	generators, direct and indirect frequency synthesis	generators, non-sine wave generators and function generator. Direct Analog Synthesis, Indirect Synthesis, Direct Digital Synthesis	
18 – 19	To study concepts of distortion	Distortion, Distortion Analyzer, Wave Analyzer, IMD Analyzer	8.2, 8.3
20 – 23	To study signal analyzers	Spectrum Analyzer, FFT Analyzer, Vector Analyzer, Logic Analyzer	8.4, 8.5, 8.6, 8.8
24 – 25	To study the measurement of frequency, period, time interval and frequency ratio	Conventional Electronic Counters, Sources of Measurement Errors, Reciprocal Counters	9.2, 9.3
26 – 27	To study the grounding and shielding techniques	Introduction, Grounding, Shielding, Protection form Electrostatic Discharge	10.2 - 10.4
28- 30	To study industrial communication protocols	OSI layers, Network Model, Network Topologies, Interface standards	14.1 - 14.3
31-33	To study parallel and other communication protocols	IEEE 488 (GPIB), IEEE 488.1, IEEE 488.2, HS 488, HART, Token buses and rings, Ethernet,	14.3
34 – 36	To study the Fieldbuses Device Networks	Moving Up the Layers ,Fieldbuses & Device Networks, Foundation Fieldbus	14.4 - 14.6
37 – 40	To study hazards area instrumentation	Hazardous Area Classifications, Enclosures, Intrinsically Safe Design, Relevant Indian Standards	15. 1 - 15.5

4. Evaluation Scheme:

Evaluation Component	Duration	Weightage	Date, Time	Remarks
Mid Test	90 Minutes	25 %		CB
Class quiz		10%		CB
Lab Record		5%		-
Lab Test		10 %		OB
Lab Quiz		5 %		CB
Lab Project		10 %		OB
Comprehensive Examination	3 Hours	35 %		Partly open book

5. **Chamber Consultation Hour:** To be announced in the class.
6. **Course Notices:** All notices related to the course will be placed on CMT.
7. **Make–up Examination:** Make-up will be given on extremely **genuine** grounds only. Prior application should be made for seeking the make- up examination.

Instructor-in-charge
INSTR F311