BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

Instruction Division
First Semester 2015-2016
Course Handout (Part II)

Date: 03.08.2015

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 : Pradyumn Chaturvedi, Kavindra Kandpal, 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
8 - 9	To study digital storage Oscilloscope	Digital storage oscilloscope, Digital phosphor oscilloscope, Controls of an oscilloscope	3.2, 3.4, 3.5, 3.6
10	To study Probes	Types of probes, loading, measurement effects	4.1, 4.2, 4.3
11	To study DC bridges.	Wheatstone bridge & Kelvin bridges	5.2
12 - 13	To study AC bridges.	Limitations of AC Bridges – Wagner Ground connection, Anderson loop, LCR Bridge	5.3, 5.4, 5.5
14 - 16	To study direct and indirect frequency synthesis	Direct Analog Synthesis, Indirect Synthesis, Direct Digital Synthesis	7.6

Lect. No.	Learning Objectives	Topics to be covered	Ref. Chapter (T)
17	To study digital signal generators	Arbitrary Waveform Generators, Arbitrary Function Generators, Pattern Generators	7.7
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 - 29	To study the Product design, layout & assembly	Product Life Cycle, Circuit Design, Circuit layout, Testing and Calibration, Power distribution, Wiring and Cabling, Enclosures, Integrated testing, Documentation	11.2 - 11.4, 11.6 – 11.11
30	To learn science of measurement	Testing, Compatibility, calibration, and Traceability	12.3
31 - 32	To study industrial communication protocols	OSI layers, Network Model, Network Topologies, Interface standards	14.1 - 14.3
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 - 35	To study the Fieldbuses Device Networks	Moving Up the Layers ,Fieldbuses & Device Networks, Foundation Fieldbus	14.4 - 14.6
36 - 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 %	5/10 8:00 - 9:30 AM	CB
Tutorial		5%		OB
Lab Test		10 %		CB
Lab Record		10 %		
Lab Project		10 %		
Comprehensive Examination	3 Hours	40 %	1/12 FN	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