Semester Plan
(Theory)

TCET/FRM/IP-02/09 **Revision: A**

Semester: III **Course: ETRX**

Subject: ELX305 : Electronic Instruments and Measurements (EIM) **Class: SE ETRX**

S.No.	Prerequisite/ Bridge course:	Duration (Week /Hrs)	Modes of Learning	Recommended Sources
1	1. Student should know the basic principles of measurement. 2. Student should know the basic AC-DC sources. 3. Basic knowledge of measuring instruments and units.	4 hours	Self Learning/ Revision	**Textbooks:** 1. David A. Bell, Electronic Instrumentation & Measurements, Oxford Publishing, 2nd edition 2. H. S. Kalsi, Electronic Instrumentation, McGraw Hill, 4th edition.

Class Room Teaching

Sr. No	Module No.	Lesson No	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
1	L.1.1	1	SOP-Orientation Theory	Power point presentation, Chalk & Board	10-07-2017	M1	
2	L.1.2	1	SOP-Orientation Theory	Black Board & Chalk, Power point presentation	11-07-2017	M1	
3	L.1.3	1	SOP-Orientation Theory	Black Board & Chalk, Power point presentation	13-07-2017	M1	
4	L.1.4	1	SOP-Orientation Theory	Power point presentation, Chalk & Board	14-07-2017	M1	
5	L.2.1	1	**Chapter 1: Principles of Measurements & Instrumentation :-** Components of a generalized measurement system	Power point presentation, Chalk & Board	17-07-2017	M1.8.1	
6	L.2.2	1	Applications of instrument systems, Static characteristics , Dynamic characteristics	Black Board & Chalk, Power point presentation	18-07-2017	M1.8.2	
7	L.2.3	1	Errors in measurement, classification of errors	Black Board & Chalk, Power point presentation	20-07-2017	M1.8.3	
8	L.2.4	1	Remedies to eliminate or to minimize errors, statistical analysis of errors	Black Board & Chalk, Power point presentation	21-07-2017	M1.8.4	
9	L.3.1	2	**Chapter 2: Measurement of R, L and C: Measurement of Resistance :-** Measurement of low, medium & high resistances	Black Board & Chalk, Power point presentation	24-07-2017	M2.9.1	
10	L.3.2	2	Measurement of low, medium & high resistances by using Wheatstone bridges	Power point presentation, Chalk & Board	25-07-2017	M2.9.1	
11	L.3.3	2	Kelvin's Double bridge	Power point presentation,	27-07-2017	M2.9.2	

11	L.3.3	2	Kelvin's Double bridge	Chalk & Board		M2.9.2	
12	L.3.4	2	Mega-ohm meter (Megger)	Power point presentation, Chalk & Board	28-07-2017	M2.9.3	
13	L.4.1	2	Measurement of Inductance & Capacitance :- Inductance & Capacitance comparison bridge	Black Board & Chalk, Power point presentation	31-07-2017	M2.9.4	
14	L.4.2	2	Maxwell's bridge, Hay's bridge	Chalk & Board, Animation	01-08-2017	M2.9.5	
15	L.4.3	2	Schering's bridge and Wien's bridge	Black Board & Chalk, Power point presentation	03-08-2017	M2.9.5	
16	L.4.4	2	LCR Q Meter	Black Board & Chalk, Power point presentation	04-08-2017	M2.9.6	
17	L.5.1	3	**Chapter 3: Oscilloscopes :-** Block diagram based study of CRO	Black Board & Chalk, Power point presentation	07-08-2017	M3.9.1	
18	L.5.2	3	Control & specifications, Sweep mode	Black Board & Chalk, Power point presentation	08-08-2017	M3.9.2	
19	L.5.3	3	Role of delay line, single & dual beam, Dual-trace CRO	Chalk & Board, Animation	10-08-2017	M3.9.3	
20	L.5.4	3	Chop & Alternate modes	Black Board & Chalk	11-08-2017	M3.9.4	
21	L.6.1	3	Measurement of voltage, frequency, rise time, fall time & phase difference,	Black Board & Chalk,	14-08-2017	M3.9.5	
22	L.6.2	3	Lissajous figures in detecting phase difference	Black Board & Chalk, Power point presentation	18-08-2017	M3.9.6	
23	L.7.1	3	Lissajous figures in detecting frequency difference	Black Board & Chalk, Power point presentation	21-08-2017	M3.9.7	
24	L.7.2	3	Digital Storage Oscilloscope :- Features like roll, refresh	Black Board & Chalk, Power point presentation	24-08-2017	M3.9.8	
25	L.8.1	3	Storage mode & Sampling rate, Applications of DSO	Black Board & Chalk, Power point presentation	31-08-2017	M3.9.10	
26	L.8.2	4	**Chapter 4: Analog and Digital Instruments :-** DVM (ramp, dual-slope, integrating & successive approximation), Digital multimeter	Black Board & Chalk, Power point presentation	01-09-2017	M4.9.1	
27	L.9.1	4	Digital frequency meter, Digital phase meter	Black Board & Chalk, Power point presentation	04-09-2017	M4.9.2	

28	L.9.2	4	Digital time measurement	Chalk & Board, Animation	05-09-2017	M4.9.3	
29	L.9.3	4	Low frequency signal generator, function generator	Black Board & Chalk, Power point presentation	07-09-2017	M4.9.4	
30	L.9.4	4	Pulse generator, RF signal generator	Black Board & Chalk, Power point presentation	08-09-2017	M4.9.5	
31	L.10.1	4	Sweep frequency generators	Black Board & Chalk, Power point presentation	11-09-2017	M4.9.6	
32	L.10.2	4	Basic wave analyzer, Frequency selective & Heterodyne wave analyzer	Black Board & Chalk, Power point presentation	12-09-2017	M4.9.7	
33	L.10.3	4	Harmonic distortion analyzer & Spectrum analyzer	Black Board & Chalk, Power point presentation	14-09-2017	M4.9.8	
34	L.10.4	4	**Chapter 5: Transducers for Displacement and Temperature Measurement :-** Characteristics of transducers & sensors, requirements of transducers	Black Board & Chalk, Power point presentation	15-09-2017	M5.9.1	
35	L.11.1	5	Classification of transducers, Criteria for selection of transducers	Black Board & Chalk, Power point presentation	18-09-2017	M5.9.2	
36	L.11.2	5	Resistance temperature detector (RTD), Thermistor, Thermocouple	Power point presentation, Chalk & Board	19-09-2017	M5.9.3	
37	L.11.3	5	Range & applications, comparison of RTD	Black Board & Chalk, Power point presentation	21-09-2017	M5.9.4	
38	L.11.4	5	Thermistor & Thermocouple	Black Board & Chalk, Power point presentation	22-09-2017	M5.9.5	
39	L.12.1	5	Potentiometers, Linear Variable Differential Transformer (LVDT)	Chalk & Board, Animation	25-09-2017	M5.9.6	
40	L.12.2	5	Resistance strain gauges	Black Board & Chalk, Power point presentation	26-09-2017	M5.9.7	
41	L.12.3	5	Capacitance sensors	Black Board & Chalk, Power point presentation	28-09-2017	M5.9.8	
42	L.12.4	6	**Chapter 6: Transducers for Pressure, Level and Flow Measurements :-** Pressure gauges,Elastic pressure transducers	Black Board & Chalk, Power point presentation	29-09-2017	M6.9.1	
43	L.13.1	6	Dead weight tester, Vacuum pressure measurement	Black Board & Chalk, Power point presentation	03-10-2017	M6.9.2	
44	L.13.2	6	McLeod gauge & Pirani gauge, Side glass tube method, Float type methods	Black Board & Chalk, Power point presentation	05-10-2017	M6.9.3	
45	L.13.3	6	Capacitance type methods, Ultrasonic type Transducers	Black Board & Chalk, Power point presentation	06-10-2017	M6.9.4	
46	L.14.1	6	Optical level detectors, Restriction type flow meter – Orifice & Venturi	Black Board & Chalk, Power point presentation	09-10-2017	M6.9.5	
47	L.14.2	6	Rotameter, Magnetic type flow meter	Black Board & Chalk, Power point presentation	10-10-2017	M6.9.6	
48	L.14.3	6	Turbine flow meter, Rotameters	Black Board & Chalk, Power point presentation	13-10-2017	M6.9.7	

Remark:			
Course:	Syllabus Coverage:	Practice Session: 2	Content Beyond Syllabus:
No. of (lectures planned)/(lecture taken): 48/			

Advanced course:	20 hours	Online NPTEL videos	Web sources: 1.NPTEL - https://onlinecourses.nptel.ac.in/noc17_ec09/preview 2.Textbook reference:Alok Barua, Fundamentals of Industrial Instrumentation, Wiley India, New Delhi 2011.

Text Books:

1. David A. Bell, Electronic Instrumentation & Measurements, Oxford Publishing, 2nd edition
2. H. S. Kalsi, Electronic Instrumentation, McGraw Hill, 4th edition

Reference Books:

1. C. S. Rangan, G.R. Sarma, V.S.V. Mani, Instrumentation Devices and Systems, Tata McGraw Hill, 9th edition.
2. A. K. Sawhney, Electrical & Electronic Instruments & Measurement, Dhanpat Rai & Sons, 11th edition
3. S. K. Singh, Industrial Instrumentation & Control, McGraw Hill, 3rd edition

Digital Reference:

Name & Signature of Faculty Signature of HOD
Signature of Principal /Dean (Academics)

Date: Date: Date:

Note:

1. Plan date and completion date should be in compliance
2. Courses are required to be taught with emphasis on resource book, course file, text books, reference books, digital references etc.
3. Planning is to be done for 15 weeks where 1st week will be AOP, 2nd -13th for effective teaching and 14th -15th week for effective university examination oriented teaching, mock practice session and semester consolidation.
4. According to university syllabus where lecture of 4 hrs/per week is mentioned minimum 55 hrs and in case of 3 lectures per week minimum 45 lectures are to be engaged are required to be engaged during the semester and therefore accordingly semester planning for delivery of theory lectures shall be planned.
5. In order to improve score in NBA, faculty members are also required to focus course teaching beyond university prescribed syllabus and measuring the outcomes w.r.t learning course and programme objectives.
6. Text books and reference books are available in syllabus. Here only additional references w.r.t. non –digital/ digital sources can be written (if applicable)
7. Technology to be used in class room during lecture shall be written below the topic planned within the bracket.