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

Semester Plan
(Theory)

Semester: III Course: EXTC

Subject: Electronic Instrumentation & Control Class: SE A

Sr. No.	Bridge courses/Technology	Duration (Week/hrs)	Modes of Learning	Recommended Sources
1.	**Prerequisite course:** Basics of linear differential equation of first order,second order system, Kirchoff's current and Kirchoff's voltage law, basic instruments	4 hrs	Self learning and classroom revision	1.D. A. Neamen, "Electronic Circuit Analysis and Design," Tata McGraw Hill, 2ndEdition. 2. G.V Kumbhojkar, "Applied Mathematics,"

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
1	-	L1.1	Subject orientation	PPT	11/07/17	--	
2	-	L1.2	Orientation of OBE	PPT	12/07/17	-----	
3	M4	L1.3	Open loop and closed loop systems, example of control systems	Black board	13/07/17	4.1	
4		L1.4	Modelling of system using Transfer function	Black board	14/07/17	4.2	
5		L2.1	Finding TF for given circuit-problems	Black board	17/07/17	4.3	
6		L2.2	Block diagram reduction rule	PPT	19/07/17	4.4	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
7		L2.3	Problem solving using using BD rule	PPT	20/07/17	4.5	
8		L2.4	MIMO SYSTEM :problem solving,	PPT	21/07/17	4.6	
9		L2.5	Introduction to Signal Flow Graph(SFG)	PPT	24/07/17	4.7	
10		L3.1	Mason's gain formula :problem solving	PPT	26/07/17	4.8	
11		L3.2	Problems based on SFG reduction	PPT	27/07/17	4.9	
12		L3.3	Dynamic response of System: Standard test signals and steady state errors	PPT	31/07/17	4.10	
13		L3.4	Analysis of second order systems	PPT	2/08/17	4.11	
14	M5	L4.1	Concept of stability ,relative stability and absolute stability Stability analysis:Routh criteria	PPT	3/08/17	5.1	
15		L4.2	Stability analysis using Routh special cases	PPT	04/08/17	5.2	
16		L4.3	Root Locus :Basic rules of Root locus drawing.	PPT	07/08/17	5.3	
17		L4.4	Root Locus: remaining rules of Root locus drawing.	PPT	09/08/17	5.4	
18		L5.1	Problem solving using root locus	PPT	10/08/17	5.5	
19		L5.2	Design of lead and lag compensator	PPT	11/08/17	5.6	
20	M6	L5.3	Frequency domain specification, Relationship between time and frequency domain specification of system	PPT	14/08/17	6.1	
21		L5.4	Bode plot rules ;constant, pole-zeros at origin ,simple poles	PPT	16/08/17	6.2	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
22		L6.1	Draw bode plot for given function using all rules	PPT	18/08/17	6.3	
23		L6.2	Draw bode plot for given function using all rules	PPT	24/08/17	6.4	
24		L7.1	Calculation of gain and phase margin and prediction of stability	PPT	30/08/17	6.5	
25		L8.1	Frequency response analysis of RC,RL,RLC circuits	PPT	31/08/17	6.6	
26		L8.2	Bode plot for second order function	PPT	04/08/17	6.7	
27		L9.1	Introduction of polar plots:	PPT	06/09/17	6.8	
28		L9.2	Problem solving using polar plots	PPT	07/09/17	6.9	
29		L9.3	Introduction to NYQUIST PLOT	PPT	11/09/17	6.10	
30		L10.1	Problem solving using Nyquist plot	PPT	13/09/17	6.11	
31		L10.2	Problem solving using Nyquist plot	PPT	14/09/17	6.12	
32	M1	L10.3	Components of generalized measurement system Concept of accuracy, precision, linearity, sensitivity, resolution, hysteresis, calibration.	PPT	15/09/17	1.1	
33		L10.4	Kelvin's double bridge, Wheatstone bridge	PPT	18/09/17	1.2	
34		L11.1	Mega ohm bridge, Maxwell bridge and Hey bridge	Black board	20/09/17	1.3	
35		L11.2	Schering bridge	Black board	21/09/17	1.4	
36		L11.3	Q-Meter: Operating principle and applications	Black board	22/09/17	1.5	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
37		L11.4	Energy and power meters: Working of energy and power meter	PPT	25/09/17	1.6	
38	M2	L12.1	Basics of sensors and Transducers-Active and passive transducers, characteristics and selection criteria of transducers,	PPT	4/10/17	2.1	
39		L12.2	Working principle of Eddy-current sensors, Pizoelectric transducers, photoelectric and photovoltaic sensors, capacitive sensors	PPT	05/10/17	2.2	
40		L13.1	Potentiometers, pressure gauges, linear Variable differential transformers(LVDT)	PPT	06/10/17	2.3	
41		L13.2	Resistance temperature detectors(RTD). Thermistors and thermocouples , their ranges and applications	PPT	12/10/17	2.4	
42	M3	L13.3	Introduction and characteristics, Landline Telemetry, Radio Telemetry Types of Multiplexing Systems,	PPT	13/10/17	3.1	
43		L14.1	Data Acquisition: Components of Analog and Digital Data Acquisition System,	PPT	16/10/17	3.2	
44		L15.1	Modern Digital Data Acquisition System.	PPT	18/10/17	3.3	
45		L15.2	Uses of Data Acquisition System, Use of recorders in Digital systems	PPT	18/10/17	3.4	
Remark:: Course:		Syllabus Coverage:		Practice Session:		Beyond Syllabus:	
No. of (lectures planned)/(lecture taken):							

Bridge courses Objective: Bridging of gaps with respect to prerequisites and industry skills or to carryout research in signal processing field**. (20 Hrs / Semester / student)**				
Sr . No.	**Bridge courses/Technology**	**Duration (Week/hrs)**	**Modes of Learning**	**Recommended Sources**
1	**Advanced course:** 1.Control engineering –Design perspective (NPTEL Course) **2.** Industrial Instrumentation (Swayam course)	12week	NPTEL ,Swayam videos and with practice session	1. https://onlinecourses.nptel.ac.in/noc17_ee12/preview 2. Stanley M. Shinners, “Modern Control System Theory and Design”, 2nd edition. **3.**Feedback Systems: An Introduction for Scientists and Engineers, by Karl Astrom and Richard M. Murray. 4. https://swayam.gov.in/course/3764-industrial-instrumentation 5. Alok Barua, *Fundamentals of Industrial Instrumentation*, Wiley India, New Delhi 2011

Text Books:

1. A.K. Sawhney, “Electrical & Electronic Measurement & Instrumentation” – DRS . India
2. M.M.S. Anand, “Electronic Instruments and instrumentation Technology”.
3. H.S.Kalsi, “Electronic Instrumentation”-TMH, 2nd Edition.
4. Nagrath, M.Gopal, “Control System Engineering”, Tata McGraw Hill.
5. K.Ogata, “Modern Control Engineering, Pearson Education”, IIIrd edition.

Reference Books:

1. Helfrick&Copper, “Modern Electronic Instrumentation & Measuring Techniques” – PHI
2. W.D. Cooper, “Electronic Instrumentation And Measuring Techniques” – PHI
3. Benjamin C.Kuo, “Automatic Control Systems, Eearson education”, VIIth edition
4. Rangan C. S., Sarma G. R. and Mani V. S. V., "Instrumentation Devices And Systems", Tata McGraw-Hill, 2nd Ed., 2004.
5. Bell David A."Electronic Instrumentation and Measurements", PHI Pearson Education, 2006.
6. Madan Gopal, “Control Systems Principles and Design”, Tata McGraw hill, 7th edition,1997.
7. Normon, “Control System Engineering”, John Wiley & sons, 3rd edition

SD	SD	SD
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Name & Signature of Faculty	Signature of HOD	Signature of 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.