Semester Plan (Theory)

TCET/FRM/IP-02/09

Semester: III

Revision: A Course: ETRX Class: SE ETRX

Subject: ELX- 304: Electrical Network Analysis and Synthesis

S.No.	Prerequisite/ Bridge course:	Duratio n (Week /Hrs)	Modes of Learning	Recommended Sources
1	Basic Electrical & Electronics Engineering Partial fraction expansion, matrices, calculus and Laplace Transforms.	бhours	Self Learning/ Revision	1. BEE-By B.L Theraja 2. Advanced engineering mathematics-By H.K. Das

Class Room Teaching

Sr.No.	Module	Lesson	Topics Planned	Teaching	PD/CD	R.B Ref	Remarks
	No.	No.		aids reqd			
1	1	L1.1	Introduction and Prerequisites to Electrical Network Analysis & Synthesis	Black Board and Chalk,	10-07-17	Module 1 1.1, 1.7 & 1.9	
2	1	L1.2	OBE (DC Circuit Analysis: Analysis of DC circuits with dependent sources using generalized loop)	Black Board and Chalk,	11-07-17	Module 1 ,1.1	
3	1	L1.3	DC Circuit Analysis : Node matrix analysis.	Black Board and Chalk,	13-07-17	Module 1 1.1	
4	1	L2.1	Application of Network Theorems to DC Circuits: Superposition,	Black Board and Chalk,	17-07-17	Module 1 ,1.1	
5	1	L2.2	Application of Network Theorems to DC Circuits: Thevenin, Norton	Black Board and Chalk,	18-07-17	Module 1 1.1	
6	1	L2.3	Application of Network Theorems to DC Circuits: Maximum Power Transfer and Millman theorems.	Black Board and Chalk,	19-07-17	Module 1 1.1	
7	2	L2.4	Introduction to Analysis of AC Circuits:	Black Board and Chalk,	20-07-17	Module 2 2.1 ,2.5 & 2.9	
8	2	L2.5	Analysis of Steady State AC circuits. Analysis of AC circuits with independent	Black Board and Chalk,	27-07-17	Module 2 2.11	
9	2	L3.1	Analysis of Steady State AC circuits: Node matrix analysis.	Black Board and Chalk,	24-07-17	Module 2 2.11	
10	2	L3.2	Application of Network Theorems to AC Circuits: Superposition, Thevenin,	Black Board and Chalk,	25-07-17	Module 2 2.11	
11	2	L3.3	Norton, Maximum Power Transfer	Black Board and Chalk,	27-07-17	Module 2 2.11	



12	2	L3.4	Millman theorems. Analysis of Coupled Circuits:	Black Board and Chalk,	27-07-17	Module 2 2.11	
13	2	L4.1	Self and mutual inductances, coefficient of coupling,	Black Board and Chalk,	31-07-17	Module 2 2.11	
14	2	L4.2	Dot convention, equivalent circuit, solution using loop analysis.	Black Board and Chalk,	01-08-17	Module 2 2.11	
15	3	L4.3	Time and Frequency Domain Analysis of Electrical Networks: Time domain analysis of R-L and R-C circuits:	Black Board and Chalk,	03-08-17	Module 3 3.1, 3.2 & 3.6	
16	3	L4.4	Time domain analysis of R-L and R-C circuits: Forced and natural responses,	Black Board and Chalk,	03-08-17	Module 3 3.7	
17	3	L5.1	Time constant, initial and final values.	Black Board and Chalk,	07-08-17	Module 3 3.9	
18	3	L5.2	Solution using first order equation for standard input signals:	Black Board and Chalk,	08-08-17	Module 3 3.9	
19	3	L5.3	Transient and steady state time response,	Black Board and Chalk,	10-08-17	Module 3 3.9	
20	3	L5.4	Solution using universal formula.	Black Board and Chalk,	10-08-17	Module 3 3.9	
21	3	L6.1	Frequency domain analysis of RLC circuits:	Black Board and Chalk,	14-08-17	Module 3 3.9	
22	3	L6.2	S-domain representation, Concept of complex frequency,	Black Board and Chalk,	17-08-17	Module 3 3.9	
23	3	L6.3	applications of Laplace Transform in solving electrical networks,	Black Board and Chalk,	17-08-17	Module 3 3.9	
24	3	L7.1	Driving point and Transfer Function,	Black Board and Chalk,	24-08-17	Module 3 3.1	
25	3	L7.2	Poles and Zeros,	Black Board and Chalk,	24-08-17	Module 3 3.1	
26	3	L8.1	Calculation of residues by analytical and graphical method.	Black Board and Chalk,	31-08-17	Module 3 3.1	
27	4	L8.2	Introduction to Two Port Networks:	Black Board and Chalk,	31-08-17	Module 4 4.1 & 4.2	
28	4	L9.1	Parameters: Open Circuit, Short Circuit	Black Board and Chalk,	04-09-17	Module 4 4.9	
29	4	L9.2	Transmission and Hybrid parameters,	Black Board and Chalk,	07-09-17	Module 4 4.9	
30	4	L9.3	relationships among parameters	Black Board and Chalk,	07-09-17	Module 4 4.9.5	
31	4	L10.1	reciprocity and symmetry conditions	Black Board and Chalk,	11-09-17	Module 4 4.9.5	
32	4	L10.2	Series/parallel connection:	Black Board and Chalk,	12-09-17	Module 4 4.9.5	
33	4	L10.3	T and Pi representations	Black Board and Chalk,	14-09-17	Module 4 4.9.5	
34	4	L10.4	interconnection of Two-Port networks.	Black Board and Chalk,	14-09-17	Module 4 4.9.5	
35	5	L11.1	Synthesis of RLC Circuits:	Black Board and Chalk,	18-09-17	Module 5 5.1 & 5.2	

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36	5	L11.2	Positive Real Functions: Concept of positive real function,	Black Board and Chalk,	19-09-17	5.9.2,	
37	5	L11.3	testing for Hurwitz polynomials,	Black Board and Chalk,	21-09-17	Module 5 5.9.3-5.9.6	
38	5	L11.4	testing for necessary and sufficient conditions for positive real functions.	Black Board and Chalk,	21-09-17	Module 5 5.9.3-5.9.6	
39	5	L12.1	Synthesis of RC, RL, LC circuits:	Black Board and Chalk,	21-09-17	Module 5 5.9.3-5.9.6	
40	5	L12.2	Concepts of synthesis of RC, driving point functions.	Black Board and Chalk,	26-09-17	Module 5 5.9.3-5.9.6	
41	5	L13.1	Concepts of synthesis of RL, driving point functions.	Black Board and Chalk,	03-10-17	Module 5 5.9.3-5.9.6	
42	5	L13.2	Concepts of synthesis of LC driving point functions.	Black Board and Chalk,	05-10-17	Module 5 5.9.3-5.9.6	
43	6	L14.1	Filters: Basic filter circuits:	Black Board and Chalk,	12-10-17	Module 6 6.1 & 6.4	
44	6	L14.2	Low pass, high pass, band pass and band stop filters ,transfer function,	Black Board and Chalk,	12-10-17	Module 6 6.5-6.11	
45	6		frequency response, cut-on frequency, bandwidth, quality factor,	Black Board and Chalk,	28-09-17	Module 6 6.5-6.11	
46	6		Design and analysis of filters: Constant K	Black Board and Chalk,	28-09-17	Module 6 6.5-6.11	
47	1 to 6	All	University paper solving	Black Board and Chalk,	07-10-17	All modules	
48	1 to 6	All	Doubt solving session	Black Board and Chalk,	07-10-17	All modules	
			No. of (lectures planned)/	(lecture taken)	: 48/		
Remark: Course:			Syllabus Coverage:		Practice Session: 2		Content Beyond Syllabus: Video Lectures based on Electrical network analysis and synthesis applications and Innovations
							Web sources:

			Web sources:
		Online NPTEL videos	1. NPTEL-
			https://onlinecourses.nptel.
Advanced Course:	2011+5		ac.in Textbook
Auvanced Course.	201115		reference:
			1. Network Analysis,
			M.E.VanValkenburg, 3/E,
			PHI.

Text Books:

1. Circuits and Networks: Analysis and Synthesis, A. Sudhakar and S.P. Shyammohan, Tata McGraw-Hill Publishing Company Ltd.

2. Engineering Circuit Analysis, William Hayt and Jack Kemmerly, McGraw-Hill.

Reference Books:

- 1. Networks and Systems, D.Roy Choudhury, New Age International Publications.
- 2. Network Analysis and Synthesis, Franklin F. Kuo, Wiley.
- 3. Network Analysis, M.E. VanValkenburg, 3/E, PHI.
- 4. Shaum's Outline of Theory and Problems of Basic Circuit Analysis, John O'Malley, McGraw-Hill.

Digital References:

- 1. https://onlinecourses.nptel.ac.in
- 2. http://myelectrical.com/

Name & Signature of Faculty

Signature of HOD

Signature of Principal /Dean (Academics)

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 synapus where recure or 4 ms/per week is mentioned minimum op ms and in case or 5 recures per week minimum 40 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.