Darbhanga College of Engineering

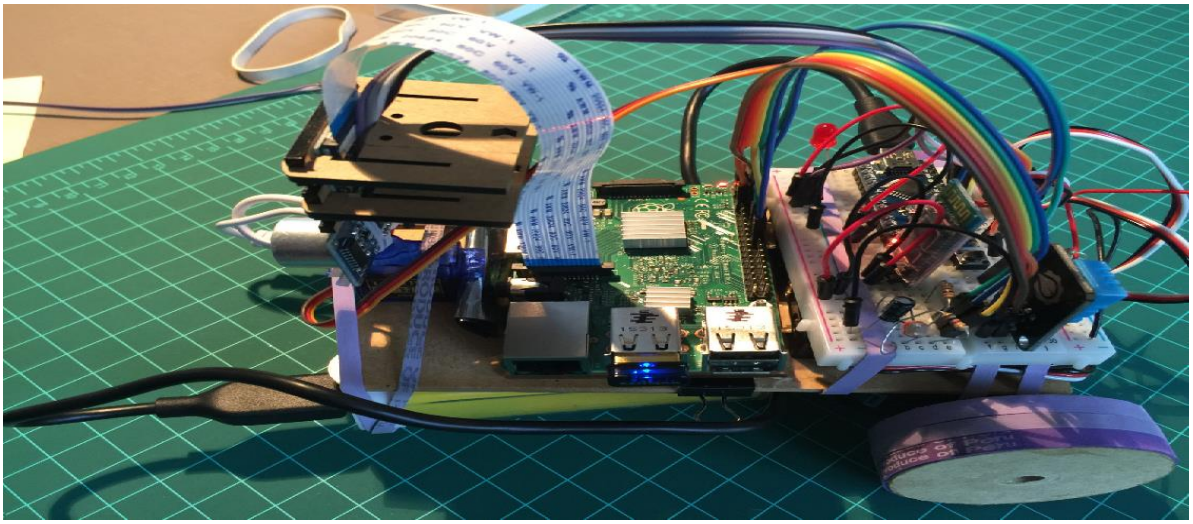
Darbhanga

Course File

Of

Network Theory

(031505)



Course Coordinator
Abhishek Sharma
Asst. Prof.
EEE Dept., DCE Darbhanga

Vision of EEE: - To bring forth engineers with an emphasis on higher studies and a fervour to serve national and multinational organisations and, the society.

Mission of EEE: -

M1: - To provide domain knowledge with advanced pedagogical tools and applications.

M2: - To acquaint graduates to the latest technology and research through collaboration with industry and research institutes.

M3: - To instil skills related to professional growth and development.

M4: - To inculcate ethical valued in graduates through various social-cultural activities.

PEO of EEE

PEO 01 – The graduate will be able to apply the Electrical and Electrical Engineering concepts to excel in higher education and research and development.

PEO 02 – The graduate will be able to demonstrate the knowledge and skills to solve real life engineering problems and design electrical systems that are technically sound, economical and socially acceptable.

PEO 03 – The graduates will be able to showcase professional skills encapsulating team spirit, societal and ethical values.

Program Outcomes of B.Tech in Electrical and Electronics Engineering

1.Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2.Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3.Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4.Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7.Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9.Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11.Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12.Life-long learning: Recognize the need and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO of EEE

PSO 01 Students will be able to identify, formulate and solve problems using various software and other tools in the areas of Automation, Control Systems, Power Engineering and PCB designing.

PSO 02 Students will be able to provide sustainable solutions to growing energy demands.

Scope and Objectives of the Course [Network Theory (031505)]:-

- To make students capable of analyzing any electrical network.
- Equip students with necessary tools for synthesizing electrical network for a given impedance or admittance function.

After the completion of this course the students will be able to:

- CO1: Apply the knowledge of basic circuital law and simplify the electric networks
- CO2: Infer and evaluate transient response, steady state response, network functions
- CO3: Analyze two port networks
- CO4: Synthesize basic electrical networks, passive filters

Mapping of CO's with PO's

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	1	-	-	-	-	-	-	-	1	1
CO3	1	2	3	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-	1	1

AKU Syllabus: Network Theory (031505)

1.Transient response of RC, RL, RLC circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.
2. Terminal pairs or ports, Network functions for one-port and two-port networks, poles and zeros of network functions, Restrictions on pole and zero locations for driving point functions and transfer functions, Time domain behaviour from the pole-zero plot.
3. Relationship of two-port variables, short circuit Admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.
4. Principles of network topology, graph matrices, network analysis using graph theory**.**
5. Filter fundamentals, high-pass, low-pass, band-pass, and band-reject filters**.**
6. Positive real functions, synthesis of one-port and two-port networks, elementary ideas of Active networks.

Gate Syllabus:

Electric Circuits

Network graph, KCL, KVL, Node and Mesh analysis, Transient response of dc and ac networks, Sinusoidal steady-state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two-port networks, Three phase circuits, Power and power factor in ac circuits.

DARBHANGA COLLEGE OF ENGINEERING, DARBHANGA

w.e.f. – 16-07-18

Individual Time Table

Faculty Name- Abhishek Sharma, Asst. Prof. (EEE Department)

Day	Branch	1 (10am-10.50am)	2 (10.50am-11.40am)	3(11.40am-12.30pm)	4(12.30pm-1.20pm)	Lunch (1.20pm – 1.50pm)	5(1.50pm – 2.40pm)	6(2.40pm-3.30pm)	7(3.30pm-4.20pm)
Monday	E.E.E.							Network Theory (T1)	
Tuesday	E.E.E.	DSP Lab							
Wednesday	E.E.E.	DSP Lab			Network Theory		Network Theory Lab(E1)		
Thursday	E.E.E.	Network Theory					Network Theory Lab(E2)		
Friday	E.E.E.							Network Theory (T2)	
Saturday	E.E.E.				Network Theory				

E.E.E. - E1 - 1 to 44

E2 – 45 to All

Prof . Incharge Routine : Ravi Kumar

Principal

D.C.E. Darbhanga
D.C.E., Darbhanga

Course Handout

Institute / College Name :	Darbhanga College of Engineering		
Program Name	**B.Tech Electrical**		
Course Code	EEUG 031505		
Course Name	Network Theory		
Lecture / Tutorial (per week):	3/1(lab)/1(T)	**Course Credits**	5
Course Coordinator Name	ABHISHEK SHARMA		

1. Scope and Objectives of the Course

- To make students capable of analyzing any electrical network.
- Equip students with necessary tools for synthesizing electrical network for a given impedance or admittance function.

1.1 Course Outcomes: After the completion of the course students will be able to

- Understand basic terminology and abstractions of circuit theory
- Analyze any given electric network
- Select appropriate tool for designing and analyzing electric circuits
- Design filter circuits and other simple electric circuits

2. Textbooks

TB1: 'Circuit Theory: Analysis and Synthesis' by A. Charkrabarty , Dhanpat Rai Publication

TB2: 'Network Analysis and Synthesis' by FF Kuo(Second Edition), Wiley

Reference Books

RB1: 'Networks and Systems' by D Roy Choudhury; New Age International

RB2: 'Network Analysis' by Van Valkenburg; PHI

RB3: Introduction to Modern Network Synthesis by Van Valkenburg; John Wiley

RB4: 'Fundamentals of Electric Circuits' 5th Edition by Charles K. Alexander, Matthew N. O. Sadiku, Mcgraw Higher Ed

Other readings and relevant websites

S.No.	**Link of Journals, Magazines, websites and Research Papers**
1.	http://nptel.ac.in/courses/108102042/

2. Lecture Plan

Lecture Number	**Date of Lecture**	**Topics**	**Web Links for video lectures**	**Text Book / Reference Book / Other reading material**
1-2		**Basics**	http://nptel.ac.in/courses/108102042/	TB1, TB2
3-5		**Step response of RC, RL circuit**	http://nptel.ac.in/courses/108102042/	TB1, TB2
6		Impulse, ramp response of RC, RL circuit	http://nptel.ac.in/courses/108102042/	
7-9		**Step, Impulse, ramp response of RLC circuit**	http://nptel.ac.in/courses/108102042/	TB1, TB2
10-12		Sinusoidal Response of RC, RL, RLC circuits	http://nptel.ac.in/courses/108102042/	
13-16		**Network functions**	http://nptel.ac.in/courses/108102042/	TB1, TB2
17-20		**Two port network: Introduction**	http://nptel.ac.in/courses/108102042/	TB1, TB2
21-23		**Two port network : Parameters Relation and Connection**	http://nptel.ac.in/courses/108102042/	TB1, TB2
24-26		**Filters**	http://nptel.ac.in/courses/108102042/	TB1, TB2
27-30		**Network Synthesis**	http://nptel.ac.in/courses/108102042/	TB1, TB2

1. **Evaluation Scheme:**

Component 1	Mid Semester Exam	20

Component 2	Assignment, Class tests, Attendance	10
Component 3**	End Term Examination**	70
	Total	**100**

****** The End Term Comprehensive examination will be held at the end of semester. The mandatory requirement of 75% attendance in all theory classes is to be met for being eligible to appear in this component.

AKU Syllabus: Network Theory (031505)

1.Transient response of RC, RL, RLC circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.
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This Document is approved by:

Designation	**Name**	**Signature**
Course Coordinator	Mr. Abhishek Sharma	
H.O.D	Mr. Santosh Kr. Gupta	
Principal		
Date		

Evaluation and Examination Blue Print:

Internal assessment is done through quiz tests, presentations, assignments and project work. Two sets of question papers are asked from each faculty and out of these two, without the knowledge of faculty, one question paper is chosen for the concerned examination. Examination rules and regulations are uploaded on the student's portal. Evaluation is a very transparent process and the answer sheets of sessional tests, internal assessment assignments are returned back to the students.

The components of evaluations along with their weightage followed by the University is given below

Sessional Test 1 20%

Assignments/Quiz Tests/Seminars 10%

End term examination 70%

Course Handout

Institute / College Name :	Darbhanga College of Engineering		
Program Name	**B.Tech Electrical**		
Course Code	EEUG 031505		
Course Name	Network Theory		
Lecture / Tutorial (per week):	3/1(lab)/1(T)	**Course Credits**	5
Course Coordinator Name	ABHISHEK SHARMA		

3. Scope and Objectives of the Course

- To make students capable of analyzing any electrical network.
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End term examination	70%

Darbhanga College of Engineering, Darbhanga

EEE Department

B.Tech [SEM V (EEE)]

Mid. Sem Exam

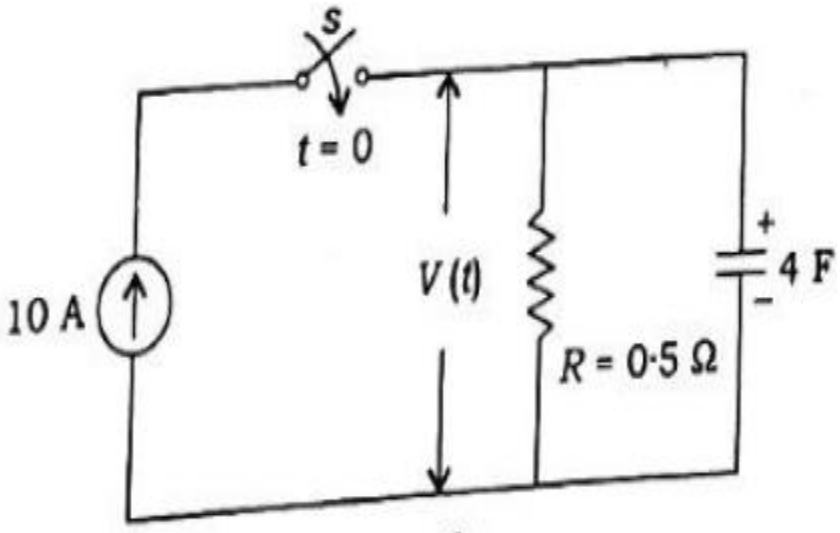
(Session: 2019-20)

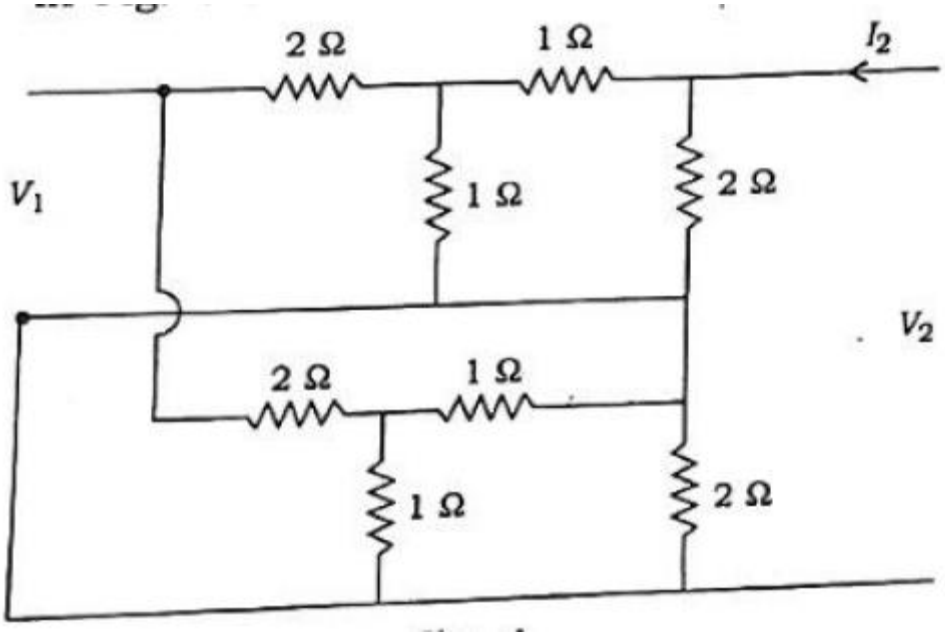
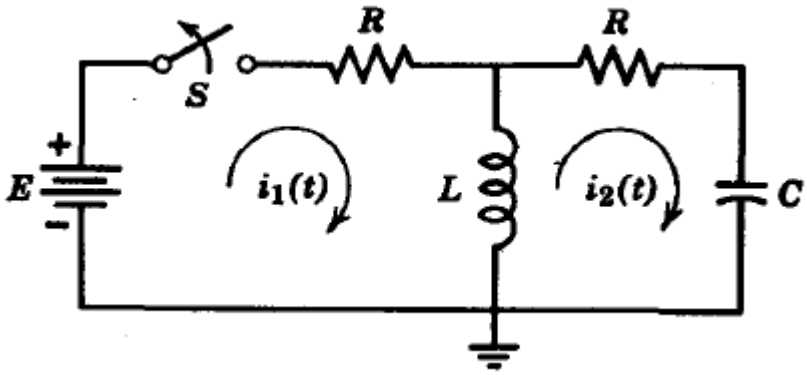
Course Code–031505

NETWORK THEORY

Time: 2 Hours ***Max. Marks: 20***

Note: Attempt all questions. CO–Course Outcomes, BL–Bloom Level

S. No.	Questions	Marks	CO	BL
1.	**Derive Z parameters in terms of ABCD parameters and vice versa.**	04	CO3	L4
2.	**For the network given in figure 1, determine v(t) for t>0.**  **Figure 1**	04	CO1 CO2	L3

3.	**Determine overall Z parameter of the network given in given in figure 2.**  **Figure 2**	**04**	**CO3**	**L4**
4.	**Derive expressions for $i_1(t)$ and $i_2(t)$ for network given in figure 3 if the switch S was opened at t=0.**  **Figure 3**	**05**	**CO1** **CO2**	**L3**
5.	**Define time constant. Give expressions for time constant for series RC and series RL network.**	**03**	**CO2**	**L3**