Department of Electrical and Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh

Lecture Plan for EEE 101
(Electrical Circuits – I)

Teacher: Dr. S. M. Mahbubur Rahman **E-mail:** mahbubur@eee.buet.ac.bd
Office: ECE 326 **Class Room:** ECE 905

Periods: Saturday @ 10:00 am – 10:50 pm
Sunday @ 10:00 am – 10:50 am
Tuesday @ 12:00 pm – 12:50 pm

Hours: Saturday @ 11:00 am – 11:50 am

Objectives:

- To introduce the students in the area of analysis of electrical systems using basic components in terms of dc current, voltage and power/energy.
- To introduce some basic theorems regarding analysis of circuits in modular approach.
- To expose with the energy storage elements and their implication on the transient and ac analysis.
- To introduce the analogy between the dc analysis and that of the steady state ac analysis.

Text:

'Fundamentals of Electric Circuits' – Charles K Alexander and Mathew N O Sadiku (3rd Ed or recent)

OUTLINE OF THE LECTURES

Week	Topics	Section(s) in Texts/Comments
1	L1: Objective and Outline of the Course	Discussion
	L2: Introduction to Electrical Elements and Circuits, Systems of Units	**S:** 1.1, 1.2
	L3: Concepts of Charge, Current and Voltage	**S:** 1.3,1.4
2	L1: Power and Energy, Circuit Elements and Examples of Application	**S:** 1.5,1.6,1.7
	L2: Introduction to Laws of Circuit Analysis. Concepts of Nodes, Branches and Loops with Examples	**S:** 2.1,2.3
	L3: Kirchhoff's Current Law (KCL) and Problem Solving	**S:** 2.4
3	L1: Kirchhoff's Voltage Law (KVL) and Problem Solving	**S:** 2.4
	L2: Series Resistors and Voltage Division, Parallel Resistors and Current Division and Problem Solving	**S:** 2.5,2.6
	L3: Wye-Delta Transformations and Problem Solving	**S:** 2.7
4	L1: Introduction to Methods of Circuit Analysis; Nodal	**S:** 3.1,3.2,3.3

Week	Topics	Section(s) in Texts/Comments
	Analysis (with Voltage Sources) and Problem Solving	
	L2: Mesh Analysis (with Current Sources); Nodal vs. Mesh Analysis; Problem Solving	**S:** 3.4,3.5,3.6, 3.7
	Class Test #1 on Circuit Analysis	
5	L1: Introduction to Circuit Theorems; Linearity and Superposition Theorem	**S:** 4.1, 4.2, 4.3
	L2: Source Transformations and Problem Solving	**S:** 4.4
	L3: Thevenin's Theorem and Problem Solving	**S:** 4.5
6	L1: Notron's Theorem and Problem Solving	**S:** 4.6
	L2: Relation between Thevenin's and Notron's Theorems	**S:** 4.7
	L3: Maximum Power Transfer and Problem Solving	**S:** 4.8
7	L1: Introduction to Capacitor and Inductor	**S:** 6.1-6.5
	L2: Introduction to First Order Circuits; Source Free RC and RL Circuits and Problem Solving	**S:** 7.1-7.4
	L3: Step Response of an RC Circuit; Problem Solving	**S:** 7.5
8	L1: Step Response of an RL Circuit; Problem Solving	**S:** 7.6
	Class Test #2 on Circuit Theorems and Transients	
	L3: Introduction to AC Voltage, Current and Power	**S:**9.1
9	L1: Sinusoids and Instantaneous Characteristics	**S:**9.2
	L2: Phasors in AC Analysis with Examples	**S:** 9.3,9.4
	L3: Impedance, Admittance, Reactance and Susceptance with Examples	**S:** 9.5
10	L1: Series, Parallel, Wye, and Delta Type Impedances	**S:** 9.7
	L2: Steady State Analysis Using Node and Mesh Techniques	**S:** 10.2,10.3
	L3: Superposition Theorem and Source Transformation for AC circuits	**S:**10.4,10.5
11	**Class Test #3 on AC Circuit Analysis**	
	L2: Instantaneous and Average power of AC Analysis	**S:** 11.2
	L3: Maximum Average Power Transfer and Problem Solving	**S:** 11.3
12	L1: RMS Value of AC Quantities with Examples	**S:** 11.4
	L2: Apparent Power and Power Factor with Examples	**S:** 11.5
	L3: Real and Reactive Power, Problem Solving	**S:** 11.6
13	L1: Conservation of AC Power	**S:** 11.7
	L2: Power Factor Correction, Problem Solving	**S:** 11.8
	Class Test #4 on AC Power Analysis	
14	L1: Review on DC Circuits, Theorems and Transients	Discussion
	L2: Review on AC circuits and Power Analysis	Discussion
	L3: Overall Discussions and Review of Course	**Feedback**

References:
(See Central Library, BUET)

- 'Basic Electric Circuit Analysis' – David E. Johnson, John L. Hilburn, Johnny R. Johnson, and Peter D. Scott (5th Ed).
- 'Electric Circuits' – James W. Nilsson and Susan A. Riedel (8th Ed)

Assessment Policy (as per University Rule):

Each of the Four (4) Class Tests would be of approximately 15 minutes long. The best Three (3) will be considered. The weights of the final grading are

- Class participation – 10%
- Class Tests – 20%
- Final Exam – 70%

Outcomes:

In completion of EEE 101, the students are expected to learn an introductory approach to analyze an electrical circuits those are energized by dc or ac sources by applying their knowledge in basic mathematics and science. A modular approach of circuit analysis using the theorems would build a capacity in a student to analyze more complex systems such as those in electronic systems in future. The students are also expected to be exposed with the transient and steady state analysis of energy storage elements that are common in practical electrical systems using their knowledge in basic calculus and complex number theory. Another outcome of the course is to learn to apply analogy in engineering applications such as that exists between the dc and ac electrical circuits.