**[EE-110 Circuit Analysis & Design](https://lms.uet.edu.pk/web)**

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| **Lecture Schedule** | See Time Table | **Course Type, Semester** | | Core, 4th Semester, Fall 2020 | |
| **Credit**  **Hours** | Three + One | **Pre-requisite** | | Non | |
| **Instructor(s)** | Habib Ullah Manzoor | **Contact** | | habib.ullah@uet.edu.pk | |
| **Office** | Room 21  EE Department | **Office Hours** | |  | |
| **Teaching**  **Assistant(s)** | Non | **Lab**  **Schedule** | | See the time table | |
| **Course Description** | This is a second course in electric circuit theory. The objective of the course is to introduce the students to advance techniques of ac circuit analysis and design. The topics to be covered include: Laplace transform, analysis using Phasors and Laplace transform, Introduction to Bode plots and frequency response analysis using Fourier Transform, single and three phase ac power systems, Two-port Networks Parameters. | | | | |
| **CLOs** | **Description** | | **Domains**  **& Levels** | | **PLOs, Levels** |
| **CLO1** | Analyze the second-order RLC circuit analysis techniques | | Cognitive, 4 | | Problem analysis, Medium |
| **CLO2** | Analyze RLC circuits using phasor analysis and Laplace Transform | | Cognitive, 4 | | Problem analysis, Medium |
| **CLO3** | Evaluate RLC circuits by applying s-domain analysis techniques including frequency response of simple circuits | | Cognitive, 5 | | Engineering Knowledge, High |
| **CLO4** | Analyze the working of single-phase ideal transformer and single-phase and three-phase ac power systems | | Cognitive, 4 | | Problem analysis, Medium |
| **Text Books** | 1. Fundamentals of Electric Circuits by Charles K. Alexander, Matthew N. O. Sadiku, McGrawHil, 5th | | | | |
| **Grading Policy** | Assignments 10%  Quizzes 20%  Midterm exam30% (CLO1-CLO2)  Final exam 50% (CLO1-CLO4) | | | | |

**Lecture Plan**

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| Week | Topic | CLO |
| 1 | **First-Order Circuits**, Introduction, The Source-Free RC Circuit, The Source-Free RL Circuit, Step Response of an RC Circuit, Step Response of an RL Circuit, **Second-Order Circuits**, Introduction, Finding Initial and Final Values | CLO1 |
| 2 | **Second-Order Circuits**, The Source-Free Series, RLC Circuit, The Source-Free Parallel, RLC Circuit, Step Response of a Series RLC Circuit, Step Response of a Parallel RLC Circuit. | CLO1 |
| 3 | **Sinusoids and Phasors**, Introduction, Sinusoids, Phasors | CLO2 |
| 4 | Phasor Relationships for Circuit Elements, Impedance and Admittance, Kirchhoff’s Laws in the Frequency Domain, Impedance Combinations. | CLO2 |
| 5 | **Sinusoidal Steady-State Analysis**, Introduction, Nodal Analysis, Mesh Analysis. | CLO2 |
| 6 | **Introduction to the Laplace Transform**, Introduction, Definition of the Laplace Transform, Properties of the Laplace Transform, The Inverse Laplace Transform, Simple Poles | CLO2 |
| 7 | The Inverse Laplace Transform, Repeated Poles, Complex Poles, The Convolution Integral, Application to Integrodifferential Equations | CLO2 |
| 8 | **Applications of the Laplace Transform**, Introduction, Circuit Element Models, Circuit Analysis, Transfer Functions. | CLO3 |
| 9 | **Frequency Response**, Introduction, Transfer Function, The Decibel Scale, | CLO3 |
| 10 | Bode Plots | CLO3 |
| 11 | Series Resonance, Parallel Resonance | CLO3 |
| 12 | Passive Filters, Low pass Filter, High pass Filter, Bandpass Filter, Band stop Filter | CLO3 |
| 13 | **Magnetically Coupled Circuits**, Introduction, Mutual Inductance, Energy in a Coupled Circuit, Linear Transformers, Ideal Transformers, Ideal Autotransformers | CLO4 |
| 14 | Three-Phase Transformers, **Two-Port Networks**, Introduction, Impedance Parameters | CLO4 |
| 15 | Admittance Parameters, Hybrid Parameters, Transmission Parameters, Relationships Between, Parameters, Interconnection of Networks | CLO4 |
| 16 | **Fourier Transform** | CLO3 |