

# Introduction

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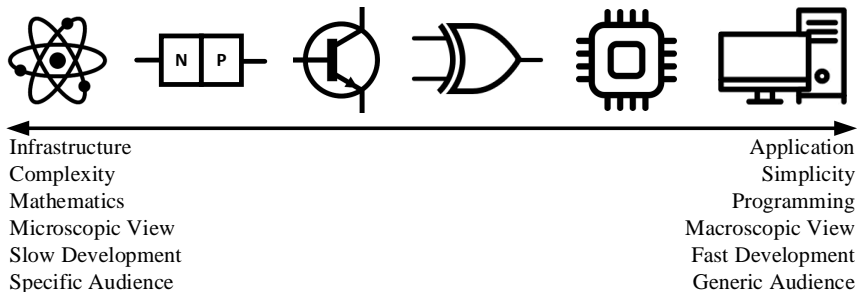
Fall 2021

# Overview

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# Course Position

# Position



**Figure:** Engineering **abstraction** levels. From left to right, the abstraction level is intended by physicists, device engineers, **electronic engineers**, digital engineers, hardware engineers, programmers.

# Course Coverage

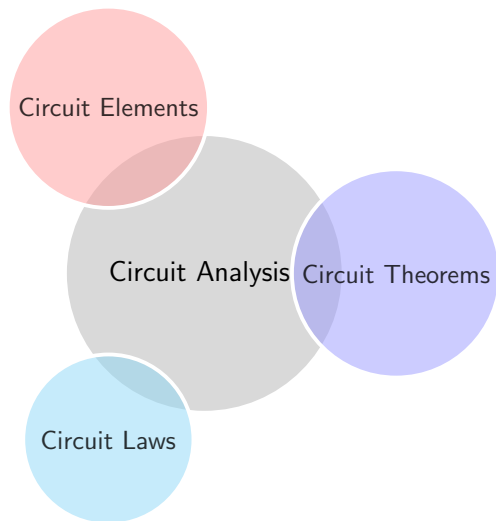


Figure: Main items covered in the course.

- 1 Circuit Laws
  - Kirchoff's Laws
- 2 Circuit Elements
  - Basic Elements
  - Coupling Elements
  - Two-ports
- 3 Circuit Analysis
  - Sinusoidal Steady State Analysis
  - Nodal and Mesh Analysis
  - Cut-set and Loop Analysis
  - Laplace Analysis
- 4 Circuit Theorems
  - Tellegen's Theorem
  - Thevenin-Norton Theorem
  - Superposition Theorem
  - Substitution Theorem
  - Reciprocity Theorem

# Course Requirements



# Requirements

- 1 Basic Knowledge
  - Electromagnetic Theory
- 2 Mathematical Tools
  - Differential Equations
  - Graph Theory
  - Laplace Transform
  - Linear Algebra
  - Complex Analysis
  - Fourier Transform
- 3 Simulation Tools
  - PSPICE
  - Proteus
  - CircuitLab
  - PSIM
  - MATLAB

# Course Resources

- 1 Online teaching class on Sundays and Tuesdays, 9:00-10:30 at <https://vc.sharif.edu/ch/mohammad.hadi>
- 2 Online practicing class on Wednesdays, 18-19:30 at <https://vc.sharif.edu/ch/mohammad.hadi>
- 3 Course website at <http://cw.sharif.edu>
- 4 Telegram channel at <https://t.me/joinchat/dDvge01vDt0zNzQ0>
- 5 Telegram group at <https://t.me/joinchat/SaVZUEk80d85MDk0>
- 6 Personal email to [mohammad.hadi@sharif.edu](mailto:mohammad.hadi@sharif.edu)
- 7 Telegram message to [@MohammadHadiDastgerdi](#)

# Course Content

Topics	# of Sessions
Introduction	0.5
Review	2
Coupled Circuits	2
Three-phase Circuits	2
Network Graphs	3
Systematic Analysis	4
State Equations	1.5
Laplace Transforms	3
Natural Frequencies	2
Network Functions	3
Network Theorems	2
Two-ports	3

**Table:** Topics presented in the course. The specified numbers of sessions are **tentative**.

# Course Assessment

# Assessments

Item	Frequency	Contribution	Bonus
Work Assignments	11	25%	✓
Short Quizzes	10	25%	✗
Final Exam	1	25%	✗
Oral Exam	1	10%	✗
Software Project	1	10%	✓
Class Attendance	28	5%	✗

**Table:** Items involved in the course assessment. The specified contribution weights are **tentative**.

# Course References



# References



Charles A. Desoer and Ernest S. Kuh (1969)

Basic Circuit Theory

McGraw-Hill Education



William H. Hayt, Jack E. Kemmerly, and Steven M. Durbin (2012)

Engineering Circuit Analysis

McGraw-Hill Education



Robert L. Boylestad (2016)

Introductory circuit analysis

Pearson Education



J. David Irwin and Robert M. Nelms (2010)

Basic engineering circuit analysis

John Wiley & Sons

# The End