

EE-406 & EE-407

Fundamentals of Electrical Circuits and Systems I & II

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Section of Electrical Engineering

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General information

Main objectives of the two courses EE-406 & EE-407

- Acquire/recall the bases of **systems**
 - Linear Time-Invariant (LTI) Systems
 - The Frequency Response & Fourier techniques
 - Laplace Techniques for LTI Systems

- Acquire/recall the bases of electric **circuits**
 - Basis quantities and fundamental theorems
 - Circuit analysis methods
 - Phasors
 - Three-phase circuits
 - Transient analysis

Table of Content

- EE-406: Systems
 - Signals & Systems: Definitions (1 lecture)
 - Linear Time-Invariant (LTI) Systems (2 lectures)
 - The Frequency Response of Stable LTI Systems (2 lectures)
 - Fourier Techniques for Stable LTI Systems (2 lectures)
 - Laplace Techniques for LTI Systems (2 lectures)
- Prerequisites :
 - Analysis

Table of Content

- EE-407: Fundamentals of Electric Circuits
 - Electrical circuit
 - Usual quantities (Charge, current, voltage, power and energy)
 - Usual circuit elements (Resistance, capacitance, inductance, voltage and current sources)
 - Kirchhoff's laws
 - Fundamental Theorems (Superposition, Thévenin, Norton, Maximum Power Transfer)
 - Analysis Methods (Nodal Analysis, Mesh Analysis)
 - Circuit in Sinusoidal Regime (Phasors, impedance)
 - Three-Phase Circuits
 - Transients Analysis

Organization of the course

- 4h per week:
 - Tuesday 1:15pm - 5:00pm
 - Lectures, exercises and lab sessions
 - EE-406 : Sept 8 - Oct 27
 - EE-407 : Nov 3 - Dec 15
- Evaluation:
 - EE-406: 100% exam - on **November 17th at 1:15pm in BC02**
 - EE-407: 70% exam (during the winter session), 30% LTSpice simulations

Agenda 2026

- EE-406 - Prof. Jean-Philippe Thiran

08.09 @ 1:15pm	Lecture 1	Introduction - systems
08.09 @ 3:15pm	Lecture 2	Linear Time-Invariant Systems
15.09 @ 1:15pm	Lecture 3	Linear Time-Invariant Systems
15.09 @ 3:15pm	Ex 1	Linear Time-Invariant Systems
22.09 @ 1:15pm	Lecture 4	Fourier methods for stable LTI systems
22.09 @ 3:15pm	Lecture 5	Fourier methods for stable LTI systems
29.09 @ 1:15pm	Ex 2	Fourier methods
29.09 @ 3:15pm	Ex 2 (cont'd)	Fourier methods
06.10 @ 1:15pm	Lecture 6	Frequency Response of stable LTI Systems
06.10 @ 3:15pm	Ex 3	Frequency Response of stable LTI Systems
13.10 @ 1:15pm	Lecture 7	Transfer Function & Laplace Transform
13.10 @ 3:15pm	Ex 4	Transfer Function & Laplace Transform
27.10 @ 1:15pm	Lecture 8	Transfer Function & Laplace Transform
27.10 @ 3:15pm	Ex 5	Transfer Function & Laplace Transform

Agenda 2026

- EE-407: Prof. Farhad Rachidi (1/2) - Provisional

03.11 @1:15-4:00	Lecture	Introduction, Basic concepts - circuit elements
03.11 @4:15-5:00	LTSpice	LTSpice Exercise 1: Introduction to LTSpice
10.11 @1:15-3:00	Lecture	Kirchhoff's laws, Fundamental theorems
10.11 @3:15-5:00	Exercises	Problem Sets 1 and 2
17.11 @3:15-4:00	Lecture	Nodal analysis, Mesh analysis
17.11 @4:15-5:00	LTSpice	LTSpice Exercise 2 : DC Analysis
24.11 @1:15-3:00	Lecture	Sinusoidal regime: phasors, impedance, admittance
24.11 @3:15-5:00	Exercise, LTSpice	Problem Set 3, LTSpice Exercise 3: Impedance

Agenda 2026

- EE-407: Prof. Farhad Rachidi (2/2) - Provisional

01.12 @1:15-3:00	Lecture	Sinusoidal regime: Thévenin/Norton equivalents, Active and reactive power
01.12 @3:15-5:00	Exercise, LTSpice	Problem Set 4, LTSpice Exercise 4: Cos phi
08.12 @1:15-3:00	Lecture	Three-phase circuits 1
08.12 @3:15-5:00	Exercise	Problem Set 5
15.12 @1:15-3:00	Lecture	Three-phase circuits 2
15.12 @3:15-5:00	Exercise, LTSpice	Problem Sets 6, 7, 8, LTSpice Exercise 5: 3-phase