ELEC 2346

Electric Circuit Theory

Department of Electrical and Electronic Engineering
Faculty of Engineering
The University of Hong Kong

Teaching Staff

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Schedule

- Lecture: Semester 1: Sep. 2, 2024 – Nov. 28, 2024 (Monday & Thursday)
  Time: Monday 5:30 pm – 6:20 pm (Venue: LE1)
  Thursday 4:30 pm – 6:20 pm (Venue: KB223)

- No class on Oct. 14 and Oct 17 (Reading Week)

- Instructor/TAs: By appointment (via email)

Course Learning Outcomes

- Master basic circuit principles and be able to perform circuit analysis.
- Master the understanding of operational amplifiers (op-amps) and op-amp circuits.
- Be able to understand the operating principle of diode circuits and operations.
- Be able to understand circuits with capacitors and/or inductors.
- Be able to understand and perform transient circuit analysis.

Course Content

Week 1, 2: Basic Circuit Principles

- Key circuit parameters
- Ohm's law, Kirchhoff's law, series or parallel connection of resistors

Week 3, 4: Circuit Analysis

- Nodal and mesh analysis
- Thevenin's and Norton's Theorems
- Operational amplifiers
- Transient response

Week 5–8: Operational Amplifiers

- Ideal vs. non-ideal op amp
- Inverting and non-inverting op amp
- Voltage follower
- Summing and difference amplifier
- Cascaded op amp circuits

Course Content

Week 8, 9: Diode Circuits

- Basic pn junction operation
- Transfer characteristics
- Diode circuits

Week 10, 11: Capacitors and Inductors

- Properties of capacitor
- Series and parallel capacitors
- Properties of inductor
- Series and parallel inductors
- Op amp with capacitor

Week 12, 13: First-order and Second-order Circuits

- Source-free RC/RL circuit
- Step response of RC/RL circuit
- First-order op amp circuit
- Source-free series/parallel RLC circuit
- Step response of series/parallel RLC circuit

Assessment

Practical Work: Lab Report (10%)

Continuous Assessment: 3 short quizzes – best 2 out of 3 (15%)
1 homework assignment (15%)

Written Examinations: Mid-term test (20%)
Final examination (40%)

Assessment (cont'd)

Tentative Dates

Quiz 1: Sep. 19, 2024

Quiz 2: Oct. 10, 2024

Midterm test: Oct. 24, 2024

Quiz 3: Nov. 14, 2024

Homework assignment: Available in Moodle around Nov. 4 (due on Nov. 28)

Final examination: TBA

Course and Assessment Policy

- Since all UG programs are delivered face-to-face, there will be no video recording during class or Zoom online meeting setup.
- A missed quiz, midterm test or homework assignment cannot be made up.
  - If you miss a quiz for any reason, you will get a zero score.
  - If you miss the midterm test due to extenuating circumstances (e.g. illness, hospitalization or accident), you are required to submit a valid medical certificate to the course instructor within FIVE calendar days after the midterm test in order to apply for a waiver of the midterm. After getting approved, your final exam will be re-weighted to be worth 60% (instead of 40%) of the final grade. Missing a midterm and failing to provide a valid medical certificate will result in a zero score for the midterm.
- Late submission policy for homework assignment:
  - Late submission between (0 second, 24 hours] is counted as 1 calendar day late (according to Moodle)
  - Number of calendar day(s) late ≤ 5 : Score $\times 0.9^{\text{number of day(s) late}}$
  - Number of calendar day(s) late > 5 : Zero score

Plagiarism

- Absolute ZERO tolerance for plagiarism.
- For official definition of plagiarism and guide to avoid, please refer to: https://tl.hku.hk/plagiarism/
- In addition, you should be familiarized with Turnitin (a web-based plagiarism detection and prevention platform). For more details, please refer to: https://libguides.lib.hku.hk/turnitin
- Any person involved in the act of plagiarism may be subject to further investigation by the relevant University disciplinary units.

Learning Resources

References

1. The Art of Electronics, by Paul Horowitz and Winfield Hill, Cambridge University Press
2. Electric Circuits, James W. Nilsson, Fourth Edition, Addison Wesley.
3. Basic Electric Circuit Analysis, David E. Johnson, et al., Third Edition, Prentice-Hall International
4. Engineering Circuit Analysis, William H. Hayt, Jr., Fourth Edition, McGraw-Hill International
5. Basic Circuit Analysis, David R. Cunningham, John A. Stuller, Houghton Mifflin
5. Circuit Analysis, Allan D. Kraus, West Publishing Company
6. Digital Design, M. Morris Mano, Second Edition, Prentice Hall

Course website

Selected course materials (i.e., lecture notes, tutorials, homework assignment, supplementary exercise, etc.) as well as announcements and important dates/deadlines will be posted on Moodle under ELEC2346 [Section 1A, 2024] Moodle. Students are advised to visit the Moodle course page on a regular basis.

Lecture notes

The lecture notes (in PDF format) available in Moodle are password-protected. To open it, remember to enter the password: **elec_2346**