Faculty of Engineering

ECE 334: Electronic Circuits

Lecture 1: Introduction

Course Overview & Objectives

- The course explores the design, construction, and debugging of electronic circuits.
- The course covers BJTs, JFETs, op-amps, and basic electronic circuit design.
- Students spend the second half of the term designing their own projects. Projects vary in scope and breadth, depending on students' level of prior background and interest.
- The course should
  - Enable the student to understand of recent developments in sensor enabling technologies. To analyse the performance of a sensor system, including transducer, electronics and signal processing.
  - enable the student to specify, build and use a set of basic instrumentation systems to acquire data from a laboratory experiment, engineering field site or test vehicle and process it using standard algorithms.

Teaching Staff

- **Instructors:**
  - Dr. Maged Ghoneima
- **Assistants:**
  - Eng. Mohamed Nabil

Course Outline

- Lecture 1 – Introduction
- Lecture 2 – BJT Large Signal Model
- Lecture 3 – BJT DC Circuit Analysis
- Lecture 4 – BJT Small Signal Model
- Lecture 5 – BJT AC Circuit Analysis
- Lecture 6 – BJT Amplifiers
- Lecture 7 – BJT Circuit Applications
- Lecture 8 – MOSFET Large Signal Model
- Lecture 9 – MOSFET DC Circuit Analysis
- Lecture 10 – MOSFET Small Signal Model
- [Midterm & Project Release]
- Lecture 11 – MOSFET AC Circuit Analysis
- Lecture 12 – MOSFET Amplifiers
- Lecture 13 – MOSFET Circuit Applications (1)
- Lecture 14 – MOSFET Circuit Applications (2)
- Lecture 15 – Differential Pair
- Lecture 16 – Operational Amplifier (Opamp)
- Lecture 17 – Opamp Applications (1)
- Lecture 18 – Opamp Applications (2)
- Lecture 19 – Project Demoes
- Lecture 20 – Project Demoes

Interaction

- I prefer dialogue in the class
- I like lots of questions
- If the questions lead us off track, we'll put them off until after class
- If I don't know, I'll tell you
- If it's relevant one of us will get the action to get the answer and report back
- Waiting to ask a question at the end is NOT a good strategy
  - May run short at the end
  - Learning best happens at the point when all of our minds are engaged on a topic
- "Teaching is an act of vulnerability" – I don't know the answers to all of your possible questions, but together we will try to find them

Course Characteristics

- This is not
  - A course to derive underlying mathematics
  - A course that teaches about one product
  - A course about tinkering
- This is a course intended
  - To introduce you to important concepts in a hands-on environment
  - To inspire a curiosity about why things work the way they do
  - To give you tools that you can use in later design courses
  - To help you develop your thinking as an engineer

Course Texts and Software

- Texts:
  - Class Notes
  - A. Sedra and K. Smith, *Microelectronic Circuits, 6th ed.*, Oxford University Press, 2010
- Circuit Simulator: www.circuitlab.com

Grading

- 5% - Attendance & Class Contribution
- 5% - Quizzes
- 5% - Labs
- 10% - Midterm Exam
- 10% - Project
- 70% - Final Exam

Academic Integrity

- Academic dishonesty is a very serious matter.
- Student-teacher relationships are built upon trust. Acts which violate this trust undermine the educational process.
- Any portion of work handed in that is not your own, should cite the author. The penalties for plagiarism and other forms of cheating can be quite harsh.
- Collaboration on assignments is encouraged, in fact essential, between lab partners. However, having one partner always work on hardware aspects and the other on the software or data analysis or report writing will be detrimental to all partners. All partners should understand and participate in all aspects of the lab exercise.
- Cheating on an exam will be considered as academic dishonesty and will result in a failing grade for the course.