

SAMPLE SYLLABUS

This syllabus is to be used as a guideline only. The information provided is a summary of topics to be covered in the class. Information contained in this document such as assignments, grading scales, due dates, office hours, required books and materials may be from a previous semester and are subject to change. Please refer to your instructor for the most recent version of the syllabus.

ABET Course Syllabus EEE335

1. **Course: EEE 335 Analog and Digital Circuits**
2. **Credits and Contact Hours:** 4 Credit Hours (lecture, lab), Topics: Engineering
3. **Course Coordinator:** Profs. Hugh Barnaby and Sule Ozev
4. **Textbook:** A.S. Sedra and K.C. Smith, *Microelectronic Circuits*, 6th Edition, Oxford University Press.
Supplemental materials: PSpice for Windows, books from various authors.
5. **Specific course information**
 - a. **Catalog description:** Analog, digital microelectronic circuits and systems. amplifiers, frequency response, gate sizing, timing analysis, sequential digital circuits.
 - b. **Prerequisites or co-requisites:** EEE334.
 - c. **Required/elective/selected elective:** Selected Elective, Required for all majors and minors
6. **Specific goals for the course**

Students can analyze basic building blocks of analog and digital microelectronics circuits and systems. Students will understand sizing impact of MOSFET and BJTs on circuit performance.

 - a. **Outcomes of instruction:**
 1. Students will be able to design and analyze combinatorial and sequential logic gates and will learn transistor sizing for digital performance.
 2. Students will be able to design and analyze midband and high frequency response of common source, common gate, source follower, cascade, and differential amplifiers.
 3. Students will analyze Miller effect and its use in compensation.
 - b. **Outcomes of Criterion 3 addressed by the course:**
 - (1) Students will be introduced to the mathematical fundamentals of logic design and logic minimization, making up vital parts of modern Digital Systems employing State Machine Design.
 - (2) Students will design components of larger Digital Systems, such as an Arithmetic Logic Unit as part of a Microprocessor.
7. **Brief list of topics to be covered**
 1. MOS Operation Review
 2. Digital Circuits (Inverter, Logic Gates): VTC, Noise Margins, Prop Delay, etc.
 3. Advanced Digital Circuits
 4. Single Stage MOS Amplifiers Low Frequency/Midband Review
 5. Bode Plots
 6. High Frequency Small Signal MOSFET and CS amplifier
 7. High Frequency Analysis Methods
 8. CG and Source Follower HF response
 9. Cascode Amplifier Operation and HF Response
 10. Differential Amplifier Operation and HF response
 11. Two Stage Operational Amplifier or Feedback (optional)

Computer Usage: Cadence simulation of AC and DC circuits.

Laboratory Experiments: Students meet weekly for a three-hour laboratory under the guidance of a TA.

Lab #1 Cadence Tutorial (weeks 3 & 4)

Lab #2 Inverter DC and dynamic response (weeks 5 & 6)

Lab #3 Design and Analysis of CMOS Gates (weeks 7 & 8)

Lab #4 Design and Analysis of Common Source Amplifier with Active Load (weeks 9 & 10)

Lab #5 Design of a differential amplifier with active and passive loads (weeks 11 & 12)

Assessment:

Through homeworks, quizzes, tests, project and final exam.

Course Contribution to Engineering Science and Design:

EEE 335 contributes to engineering science through electronic circuit analysis, problem solving, computer solutions, and applications of mathematics and physics.

Person preparing this description and date of preparation: K. Tsakalis, S. Ozev, H. Barnaby, 2021.