

University of Puerto Rico, Mayagüez Campus
Electrical and Computer Engineering Department - College of Engineering
Syllabus & Instructor Information Sheet Form

General Information

Course Number: INEL 6055

Course Title: Physics of Semiconductor Devices

Credit-Hours: 3 credits (conference hours per week)

Course Description

This course covers the physics of modern semiconductor devices and integrated circuits at the introductory graduate level. No previous knowledge of quantum physics is assumed. The fundamentals of semiconductor materials are studied. This is followed a review of p-n junctions from the point of view of MOS structures and diodes. The principles of MOSFET and BJT are then studied. The course end with a review of integrated circuit devices and technologies, and an overview of photonic devices.

Pre-requisites

INEL 4202 or equivalent. Required

Textbook, Supplies and Other Resources

UNDERSTANDING SEMICONDUCTOR DEVICES, by Sima Dimitrijevic. Oxford University Press, 2000, ISBN 0-19-513186-X.

Course Goals

After completing this course the student should understand:

- physics of semiconductor devices
- SPICE device modeling parameters and their measurement
- fundamental issues associated with integrated circuits
- basic physics of photonics devices

Requirements

All students are expected to:

- Complete all lessons.
- Do all assigned readings and related homework.
- Perform design exercises at home or laboratory.
- Come to class prepared to answer questions or pop quizzes on previous material.
- Come to class all the time and on time.
- Pass all tests to receive credit for the course.

Instructor Information

- Name: Dr. Manuel Toledo Quiñones
- Title: Assistant Professor
- Office: Terrats 214
- Phone: ext. 3097
- Office Hours: To be announced
- E-mail: mtoledo@ece.uprm.edu
- Web page: <http://www.ece.uprm.edu/~mtoledo>

Student Evaluation Criteria

The final grade will be given based on the student performance on midterm and final exams and on homework projects. Weights of 40%, 40% and 20% will be given to the final exam, midterm exam and homework projects, respectively. A grading curve with break points at 85, 75, 65 and 55 is used. A minimum passing grade of 75 (B) is required for approval without restrictions for graduate students. A minimum passing grade of 65 (C) is required for approval without restrictions for undergraduate students.

Attendance and Behavior

Attendance is compulsory as per Campus Regulations. Students are expected to behave in accordance with Campus Regulations. Students are expected to dress according to the solemnity of a Professional School; i.e., no body exposing modeling or sports participation clothing, no bathing sandals, no hats on in classroom.

Tentative Course Outline

Topic	Textbook Chapter	# of Lectures
Introduction to semiconductors	1	6
Reverse-biased P-N junctions - Capacitance	2	6
Forward-biased P-N junctions	3	6
MOSFETs	5	6
Bipolar transistors	6	6
IC Devices and Technologies	7	6
Photonic Devices	8	6
Reviews and Exams		3

Laboratory/Field Work

Laboratory work might be required for this course.

No electronic equipment is permitted in the classroom at any time, unless approved by the professor or off. Smoking is not permitted in any area other than those areas designated for smoking.

Department/Campus Policies

Class attendance: Class attendance is compulsory. The University of Puerto Rico, Mayagüez Campus, reserves the right to deal at any time with individual cases of non-attendance. Professors are expected to record the absences of their students. Frequent absences affect the final grade, and may even result in total loss of credits. Arranging to make up work missed because of legitimate class absence is the responsibility of the student. (Bulletin of Information Undergraduate Studies, pp 39 1995-96)

Absence from examinations: Students are required to attend all examinations. If a student is absent from an examination for a justifiable reason acceptable to the professor, he or she will be given a special examination. Otherwise, he or she will receive a grade of zero or "F" in the examination missed. (Bulletin of Information Undergraduate Studies, pp 39, 1995-96)

Final examinations: Final written examinations must be given in all courses unless, in the judgment of the Dean, the nature of the subject makes it impracticable. Final examinations scheduled by arrangements must be given during the examination period prescribed in the Academic Calendar, including Saturdays. (see Bulletin of Information Undergraduate Studies, pp 39, 1995-96).

Partial withdrawals: A student may withdraw from individual courses at any time during the term, but before the deadline established in the University Academic Calendar. (see Bulletin of Information Undergraduate Studies, pp 37, 1995-96).

Complete withdrawals: A student may completely withdraw from the University of Puerto Rico, Mayagüez Campus, at any time up to the last day of classes. (see Bulletin of Information Undergraduate Studies, pp 37, 1995-96).

Disabilities: All the reasonable accommodations according to the Americans with Disability Act (ADA) Law will be coordinated with the Dean of Students and in accordance with the particular needs of the student.

Ethics: Any academic fraud is subject to the disciplinary sanctions described in article 14 and 16 of the revised General Student Bylaws of the University of Puerto Rico contained in Certification 018-1997-98 of the Board of Trustees. The professor will follow the norms established in articles 1-5 of the Bylaws.

Campus Resources

General Library and University Computer Center is available to obtain professor' reference materials. The University' Counseling Office has a tutorial program for students who need extra help. There are special laboratories at the Department, including computational facilities for the use of authorized students during posted hours.