

University of Puerto Rico
 Mayagüez Campus
 College of Engineering
 Department of Electrical and Computer Engineering
 Graduate Program in Electrical Engineering

Course Syllabus

1. General Information:

Alpha-numeric codification: INEL 6055
 Course Title: PHYSICS OF SEMICONDUCTOR DEVICES
 Number of credits: 3
 Contact Period: 3 hours of lecture per week

2. Course Description:

English: This course deals with solid-state electronic devices that utilize the conductive, dielectric, magnetic and optical properties of materials. Some of the topics included are atomic structure, inter-atomic forces and crystal structures, conduction mechanisms, transport phenomena, and application of these theories to semiconductor devices.

Spanish: Este curso trata con aparatos electrónicos de estado sólido que utilizan las propiedades de conducción, dieléctricas, magnéticas y ópticas de los materiales. Algunos tópicos incluidos son la estructura atómica, fuerzas inter-atómicas, estructuras cristalinas, mecanismos de conducción, fenómenos de transporte, y aplicaciones de estas teorías a los aparatos semiconductores.

3. Pre/Co-requisites and other requirements:

4. Course Objectives:

Student should be able to describe physical theories that explain the behavior of solid state devices that will provide them with a foundation for advance work in electronics.

5. Instructional Strategies:

- conference discussion computation laboratory
- seminar with formal presentation seminar without formal presentation workshop
- art workshop practice trip thesis special problems tutoring
- research other, please specify:

6. Minimum or Required Resources Available:

Standard lecturing facilities.

7. Course time frame and thematic outline

Outline	Contact Hours
1. Semiconductor physics and conductivity	10
2. Capacitance of reverse-biased PN junctions and MOS structures	6
3. Forward-biased PN junctions	5
4. MOSFETs	4
5. Bipolar transistors	6
6. IC Devices and technologies	4
7. Photonic devices	7

8. Tests	3
Total hours: (equivalent to contact period)	45

8. Grading System

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	2	60
<input checked="" type="checkbox"/> Final Exam	1	30
<input type="checkbox"/> Short Quizzes		
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographs		
<input type="checkbox"/> Portfolio		
<input type="checkbox"/> Projects		
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: Homework	3-4	10
TOTAL:		100%

10. Bibliography:

1. Sima Dimitrijevic, Principles of Semiconductor Devices, Oxford University Press, 2006.
2. S.M. Sze and Kwok K. Ng, Physics of Semiconductor Devices, Wiley and Sons, 2006.
3. J.P. Colinge and C.A. Colinge, Physics of Semiconductor Devices, Springer, 2005
4. R.F. Pierret, Advanced Semiconductor Fundamentals, Prentice-Hall, 2002
5. R. Muller and T. Kamins, Device Electronics for Integrated Circuits, Wiley, John and Sons, 2002

11. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

Person who prepared this description and date of preparation:

Manuel Toledo, August 2007