

Technology of Semiconductors

Course description

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Technology of Semiconductors

Semester: 1

Number of credits: 4

Type: optional

Objectives

The objective of this course is for students to acquire a basic knowledge of the most important technological processes applied to semiconductor materials used primarily in the field of nano- and microelectronics. Furthermore, the main effects that these technological processes have on the optical and electrical properties will be explained as well as their application in optoelectronic devices.

Program

TOPIC

- I.- Introduction to semiconductor materials
- II. Manufacture of semiconductor materials
- III. Epitaxy of semiconductor materials
 - III.1 Liquid Phase Epitaxy technique (LPE)
 - III.2 MOCVD technique

III.3 MBE technique

IV. Doping techniques materials

IV.1 Doping by diffusion

IV.2 Doping by ion implantation

V. Thermal Oxidation

VI. Deposition in stage vapor (CVD) of insulating materials

VII. Metallization

VIII. Chemical attacks wet and dry

IX. Optical lithography and electron beam

Bibliography

The teaching material consists of a collection of slides of the different classes taught that will be fully accessible through the web page of the course, even prior to the corresponding class.

It does not follow a particular book, but there are recommended a few for reference, all available in the school library:

– S.M. Sze, “Physics of Semiconductor Devices”. John Willey & Sons, 3rd edition (2007)

– - G.S. May, S.M. Sze, “Fundamentals of Semiconductor Fabrication”, John Wiley & Sons (2003).

5. MATERIAL RESOURCES AVAILABLE

For the development of this course there is no additional material resources are required.

Teachers

Coordinator: Miguel Ángel Sánchez García

Teachers: Álvaro de Guzmán Fernández González

Teaching Methodology

For the development of the course there will be theory participative classes and discussion sessions and resolution practical problems. A collaborative teaching methodology will be used, promoting student-teacher interaction in tutoring and student-student, through discussions.

Evaluation

First exam

The score is divided in several parts:

First part of the course (exercises) : 10%

Second part of the course (exercises) : 15%

Third part of the course (exercises) : 15%

Written exam including all subjects: 60%

Extraordinary exam

A unique written exam including all subjects.

Contact

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Moodle: <http://moodle.upm.es/titulaciones/oficiales/course/view.php?id=3516>