MSE-442

Introduction to crystal growth by epitaxy

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Cursus	Sem.	Type
Materials Science and Engineering	MA2, MA4	Opt.

Language of teaching	English
Credits	2
Session	Summer
Semester	Spring
Exam	During the semester
Workload	60h
Weeks	14
Hours	**2 weekly**
Lecture	2 weekly
Number of positions	

Summary

This is an interactive course explaining: 1. The main physical and chemical concepts to understand epitaxy of crystalline thin films. 2. What determines the morphology, composition and structure of a material grown per epitaxy.

Content

1. Structure and energy of epitaxial interfaces.
2. Mechanism of growth of epitaxial films.
3. The role of surfactants in epitaxial growth
4. Phase diagrams in crystal growth. Particular caseof III-V semiconductors.
5. Epitaxy techniques
6. Epitaxy of nanostructures

Keywords

epitaxy, thin films, heterostructures, quantum wells,
quantum dots, nanowires.

Learning Outcomes

By the end of the course, the student must be able to:

- Argue the physical and chemical processes giving place to the growth of materials
- Apply the knowledge acquired for processes of epitaxy of new materials

Transversal skills

- Use a work methodology appropriate to the task.
- Give feedback (critique) in an appropriate fashion.
- Communicate effectively, being understood, including across different languages and cultures.
- Collect data.
- Respect the rules of the institution in which you are working.
- Take responsibility for environmental impacts of her/ his actions and decisions.
- Demonstrate the capacity for critical thinking
- Take feedback (critique) and respond in an appropriate manner.

Teaching methods

Ex cathedra, visits to laboratory

Expected student activities

Attend courses, oral presentations, reports

Assessment methods

Oral presentations, reports

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Prerequisite for

Semester projects, Master thesis, PhD