INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

Nanotechnology

Physics of semiconductors, part 2

IDENTIFICATION

CODE : M2-NANO-NANO-S3-3
ECTS : 6.0

HOURS

Lectures :	20.0 h
Seminars :	16.0 h
Laboratory :	12.0 h
Project :	0.0 h
Teacher-student contact :	48.0 h
Personal work :	15.0 h
Total :	63.0 h

ASSESSMENT METHOD

Written exam
Graded reports on lab practicals
Evaluation of problem based learning activity

TEACHING AIDS

TEACHING LANGUAGE

English

CONTACT

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AIMS

The course presents the fundamental concepts and purposes of semiconducting nanostructures. It shows how the size reduction of semiconducting materials can lead to fundamental technological breakthroughs. In particular, the tailoring of the properties of electronic or phononic transport as well as of light emission are illustrated through recent examples (superlattices, 2D electron gas, quantum cascade lasers) and potential applications (nanowire transistors, single photon sources).

BIBLIOGRAPHY

- Peter Y. Yu and Manuel Cardona, \Fundamentals of Semiconductors: Physics and Materials Properties", Springer-Verlag, Berlin, fourth edition, 2010
- Claus F. Klingshirn, \Semiconductor Optics", Springer-Verlag, Berlin, third edition, 2007
- Christophe Delerue, Michel Lannoo, \Nanostructures: Theory and Modeling", Springer-Verlag, Berlin, 2004.

PRE-REQUISITE

physics of semiconductors, part 1 (or an equivalent introduction to the physics of semiconductors)

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