Reg No: FAK2 2008/9:31

Faculty of Technology and Science
Physics

Syllabus

Course Approval
The syllabus was approved by the Faculty Board of Technology and Science on 26 November 2008, and is valid from the Spring semester of 2008 at Karlstad University.

Course Code: CBGB06
Nanoscience I, 7.5 ECTS Credits
(Nanovetenskap I, 7.5 Swedish credit points)
Degree Level: Bachelor
Progression Level: B

Language of Instruction
Swedish or English.

Prerequisites
For admission to the course knowledge corresponding to 30 ECTS credits Mathematics and 30 ECTS credits Physics is required.

Major Field of Study
Physics.

Learning Outcomes

Upon completion of the course students should be able to:
- present an overview of the various areas of nanoscience,
- explain some basic phenomena appearing on the nanoscale, within low-dimensional physics and chemistry
- describe the most important methods for the synthesis of nanostructures, and choose method depending on the need for a certain structure
- describe the most important methods for characterizing nanostructures, and choose characterization method for a certain investigation
-give examples on and analyze some applications of nanotechnology.
- seek and critically find literature about research on nanoscience.

Content and Form of Instruction

Instruction is given in the form of lectures, seminars, groupwork and laboratory work.

Areas treated in the course:

- Nanoscience and society.
- Basic physical properties and phenomena in nanometersized and low-dimensional structures.
- Synthesis of isolated nanoparticles and their electronic, magnetic and optical properties.
- Low-dimensional structures on surfaces, quantum wells, quantum wires and quantum dots.
- Synthesis with top-down and bottom-up techniques.
- Experimental methods for characterisation of nanostructures.
- Molecular and biological nanostructures.
- Nanostructured bulkmaterials.
- Applications of nanotechnology, e.g. one-electron transistors, catalysis, NEMS, solar cells, molecular electronics and functional materials.

Reading List

See separate document.

Examination

Examination is in the form of written or oral tests, hand-in assignments and oral presentations.

Grades

Engineering students are awarded one of the grades Fail (U), Pass (3), Some Distinction (4), or Distinction (5) in the examination of the course. Other students are awarded one of the grades Fail (U), Pass (G), or Distinction (VG) in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

The local regulations for studies at the Bachelor's and Master's levels at Karlstad University, ref. C2007/368, stipulate the obligations and rights of students and staff.

The course is an elective course in the Master of Science in Engineering programme, broad curricular base.

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