Elementary Particle Physics

Programme course

6 credits

Elementarpartikelfysik

TFYA27

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Replaced by
TFYT05

Main field of study
Applied Physics, Physics

Course level
Second cycle

Advancement level
A1X

Course offered for
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Physics and Nanoscience, Master's programme
- Applied Physics and Electrical Engineering - International, M Sc in Engineering

Specific information
The course is given every second year. It will not be available during 2017.

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
A basic course in quantum mechanics including perturbation theory. Analytical Mechanics, Quantum dynamics and Relativistic Quantum Mechanics or Theory of Relativity are recommended (may be studied in parallell).

Intended learning outcomes
The aim with the course is to give the student a good introduction to modern particle physics. After a successful course the student can:
- solve basic problems within basic nuclear physics with different formalisms, for instance within different models of the nucleus
- use relativistic four vector formalism to solve problems within particle physics
- use a mathematical formalism to treat some fundamental concepts within particle physics like isospin, SU(3), SU(4), SU(5), and so called gauge invariance to solve some longer theoretical issues.

Course content
Introduction to subatomic physics. General properties of nuclei. The nuclear shell model. Review of subnuclear physics. Symmetry transformations and conservation laws. The quark model. Weak and strong interaction. The standard model and experimental tests of this. Beyond the standard model.

Teaching and working methods
The course is given in the form of lectures (and possibly a guest lecture about current research) . The course will be given provided a sufficient number of students have registered. The course will be given in English if needed.

Examination

MUN1	Optional oral examination for higher grades	0 credits	U, 3, 4, 5
UPG1	Homework problems and oral presentation	6 credits	U, 3, 4, 5

Homework problems may give the grades U, 3 or 4. An oral exam may increase the grade with at most one step.

Grades
Four-grade scale, LiU, U, 3, 4, 5

Department
Institutionen för fysik, kemi och biologi

Director of Studies or equivalent
Magnus Johansson

Examiner
Ferenc Tasnadi

Course website and other links
http://www.ifm.liu.se/courses/tfya27/elementaryparticles.html

Education components
Preliminary scheduled hours: 44 h
Recommended self-study hours: 116 h

Course literature

Additional literature

Books

David Griffiths, *Introduction to Elementary Particles* Wiley

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.