Advanced Quantum Theory - physics606

Degree - M.Sc. in Physics (PO von 2014)

Module	**Elective Courses Theoretical Physics**
Module No.	ECThPhysics

Course	**Advanced Quantum Theory**
Course No.	physics606

Category	**Type**	**Language**	**Teaching hours**	**CP**	**Semester**
Required	Lecture with exercises	English	3+2	7	WT

Requirements for Participation:

Preparation: Theoretical courses at the Bachelor degree level

Form of Testing and Examination: Requirements for the module examination (written examination): successful work with exercises

Length of Course: 1 semester

Aims of the Course: Ability to solve problems in relativistic quantum mechanics, scattering theory and many-particle theory

Contents of the Course:

Born approximation, partial waves, resonances

advanced scattering theory: S-matrix, Lippman-Schwinger equation

relativistic wave equations: Klein-Gordon equation, Dirac equation

representations of the Lorentz group

many body theory

second quantization

basics of quantum field theory

path integral formalism

Greens functions, propagator theory

Recommended Literature:

L. D. Landau, E.M. Lifschitz; Course of Theoretical Physics Vol.3 Quantum Mechanics (Butterworth-Heinemann 1997)

J. J. Sakurai, Modern Quantum Mechanics (Addison-Wesley 1995)

F. Schwabl, Advanced Quantum Mechanics. (Springer, Heidelberg 3rd Ed. 2005)