Theoretical Condensed Matter Physics - physics617

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

Module	**Specialization: Theoretical Physics**
Module No.	physics61c

Course	**Theoretical Condensed Matter Physics**
Course No.	physics617

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

Requirements for Participation:

Preparation:

Advanced Quantum Theory (physics606)

Quantum Field Theory (physics755)

Group theory (physics751)

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

Length of Course: 1 semester

Aims of the Course: Introduction to the theoretical standard methods and understanding important phenomena in the Physics of Condensed Matter

Contents of the Course:

Crystalline Solids: Lattice structure, point groups, reciprocal lattice

Elementary excitations of a crystal lattice: phonons

Electrons in a lattice; Bloch theorem, band structure

Fermi liquid theory

Magnetism

Symmetries and collective excitations in solids

Superconductivity

Integer and fractional quantum Hall effects

Recommended Literature:

N. W. Ashcroft, N.D. Mermin, Solid State Physics (Saunders College 1976)

P. M. Chaikin, T.C. Lubensky; Principles of Condensed Matter Physics (Cambridge University Press 1997)

W. Nolting; Grundkurs Theoretische Physik Band 7: Vielteilchentheorie (Springer, Heidelberg 2002)

Ch. Kittel; Quantentheorie der Festkörper (Oldenburg Verlag, München 3. Aufl. 1989)